JANUARY 19, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Explosive forming excites . . .

even the most conservative . . .

But consider deeper facts, too

Why does explosive forming work? Three authorities, Messrs. Rinehart (top) Philipchuk (center), and Pearson (bottom), give their views on this amazing new technique . . . Page 62

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What U. S. Man-in-Space Project Will Mean to Metalworking

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UAW Rounds Up the Strays

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How Salary Levels Get Set

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New Cold-Phosphating Process Prevents Underfilm Corrosion

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Automatic Forging Saves 25%

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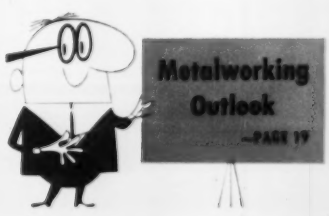
Ferroalloy Sales To Rebound



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NEW EC&M STARTER

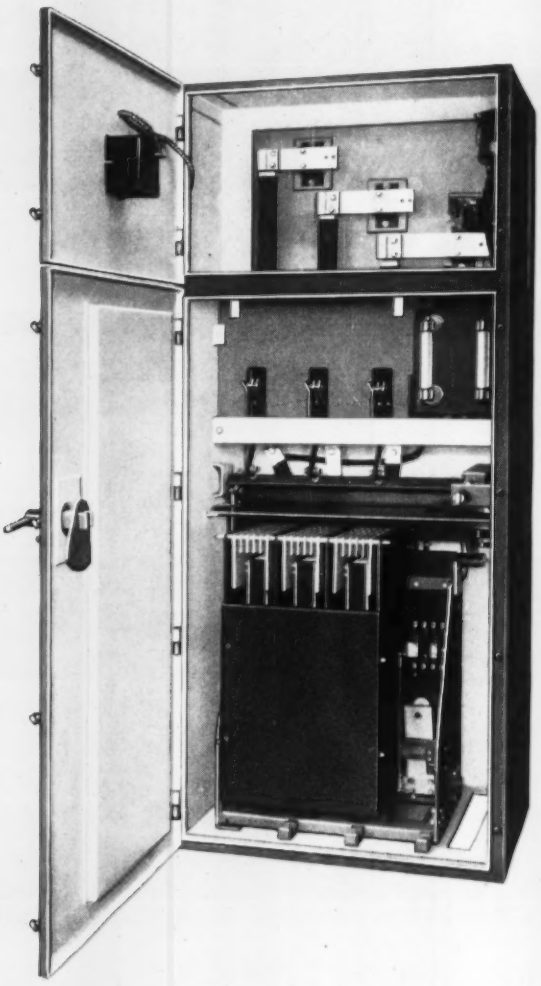
GIVES

100/150 MVA

fault protection

WITHOUT

FUSES!



Proven by tests conducted by an independent testing station, EC&M's new "fuseless" ZHA air-break starter has a certified interrupting capacity of 100,000 KVA at 2400 volts, 150,000 KVA at 4800 volts. This starter is simpler and much more accessible for inspection and checking connections.

The ZHA starter is not subject to problems associated with fuses. Single phasing due to blown fuses is eliminated...no costly replacement fuses to stock.

For positive personnel safety, the ZHA is equipped with a 3-way doorlatch, interlocked between disconnect switch and contactor interlocking system. The disconnect switch is gang-operated. When the door is open, disconnect blades are *visible* in the open and grounded position.

No roll-out needed...phase barrier and arc-chutes draw out horizontally, making front and rear contact tips readily accessible. Bus bars are used for power connections throughout the starter. Redesigned arc-chutes and interphase barrier, and improved contactor are additional features which make the ZHA starter your logical choice for high-voltage motor drives.

***GET THE COMPLETE STORY** on certified fuseless fault protection for high-voltage motor drives. Write for Bulletin 8130*

THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY

CLEVELAND 28 • OHIO

2320

Strength

that comes only from forging and rolling

Strength is the first requirement of any crane wheel. Nothing else counts quite so much. This wheel has it.

The wheel was machined from a Bethlehem forged-and-rolled blank—a unique type of blank that is strong all over, and all the way through.

Bethlehem's forging-and-rolling method produces blanks with excellent grain flow and freedom from porosity. The metal down inside, as well as on the surface, is of uniform quality. This makes the machinist's job easier; he can work with confidence. The blanks can be turned, bored, faced, and hobbed with complete assurance of a good finished product.

You can obtain Bethlehem forged-and-rolled blanks in a wide range of sections, and in sizes from 10 to 46 in. OD. Use them when making crane wheels, gears, flywheels, pipe flanges, turbine rotors, sheave wheels, and similar items. Prices are competitive.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
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BETHLEHEM STEEL

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creative designing calls for an open mind

Leonardo Da Vinci's design for an odometer

Model courtesy of IBM

EVEN DA VINCI'S ODOMETER COULD HAVE BEEN BETTER WITH HELP FROM AN SKF ENGINEER.

An SKF engineer can afford to concentrate on your bearing problem rather than his own product line—because the SKF line includes all four types of ball and roller bearings in many thousands of sizes. This gives him the kind of flexibility he needs to keep an open mind on any bearing problem. Give your problem to SKF and see. 7836

Spherical, Cylindrical, Ball, and "Tyson" Tapered Roller Bearings

EVERY TYPE—EVERY USE

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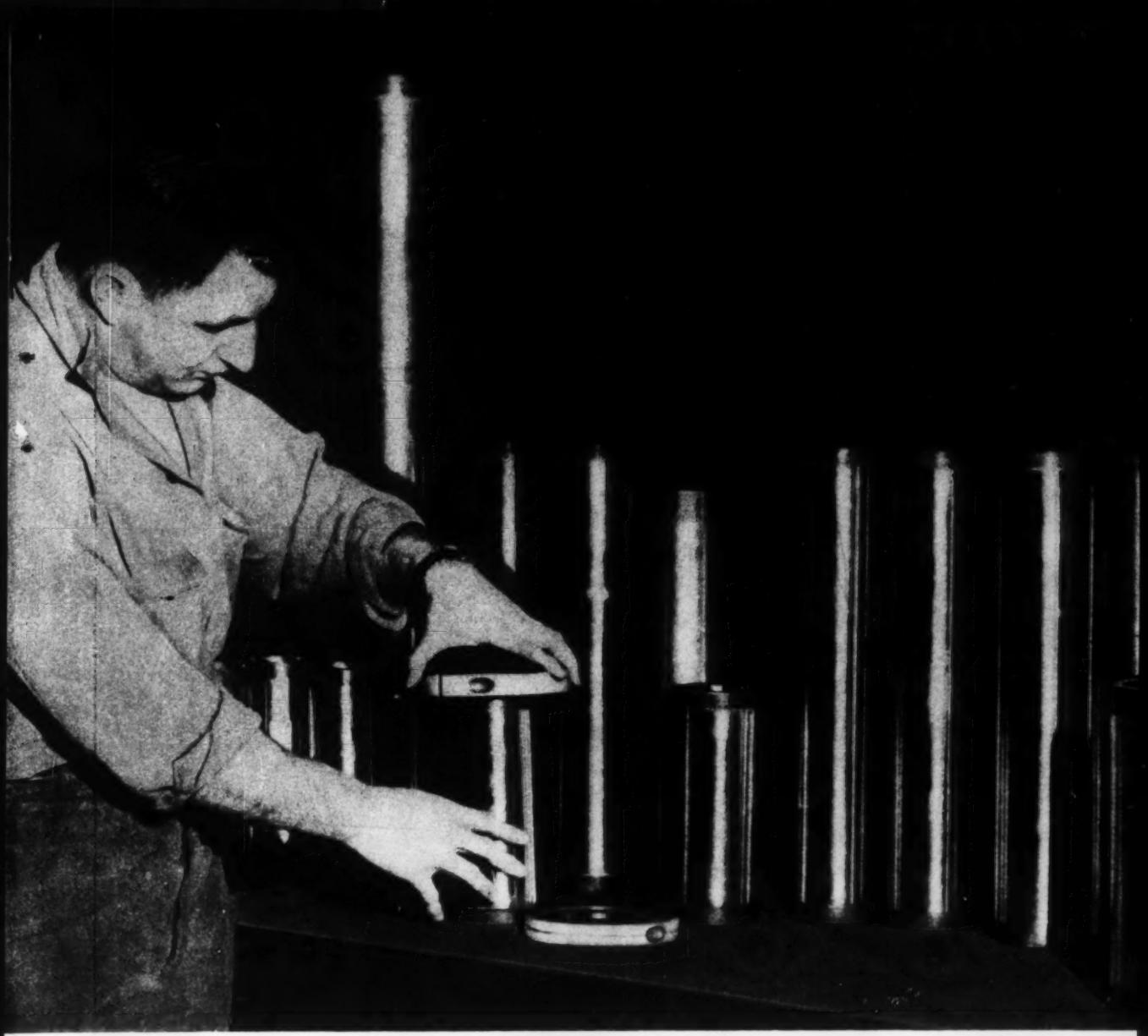
REG. U. S. PAT. OFF



WHO FORGES THE TOUGH ONES? . . . and machines and chrome plates them, too?

In producing the actuator cylinders shown above, we melted the steel, forged and precision machined the cylinders, and then chrome plated the bore to provide a wear-resistant surface. National Forge did the entire job—including final honing to an 8 RMS finish tolerance ±.001. Our extensive chrome plating work, a specialty of the National Forge Company, made it possible to complete the *unusual* requirements in this tough job, from beginning to end, all at a single responsible source.

If you have an unusually tough forging, machining, or finishing job—call National Forge.

NATIONAL FORGE COMPANY
IRVINE, WARREN COUNTY, PA.

For more information on "the tough ones," and the machinery that makes them "best"—write for Bulletin NFO.

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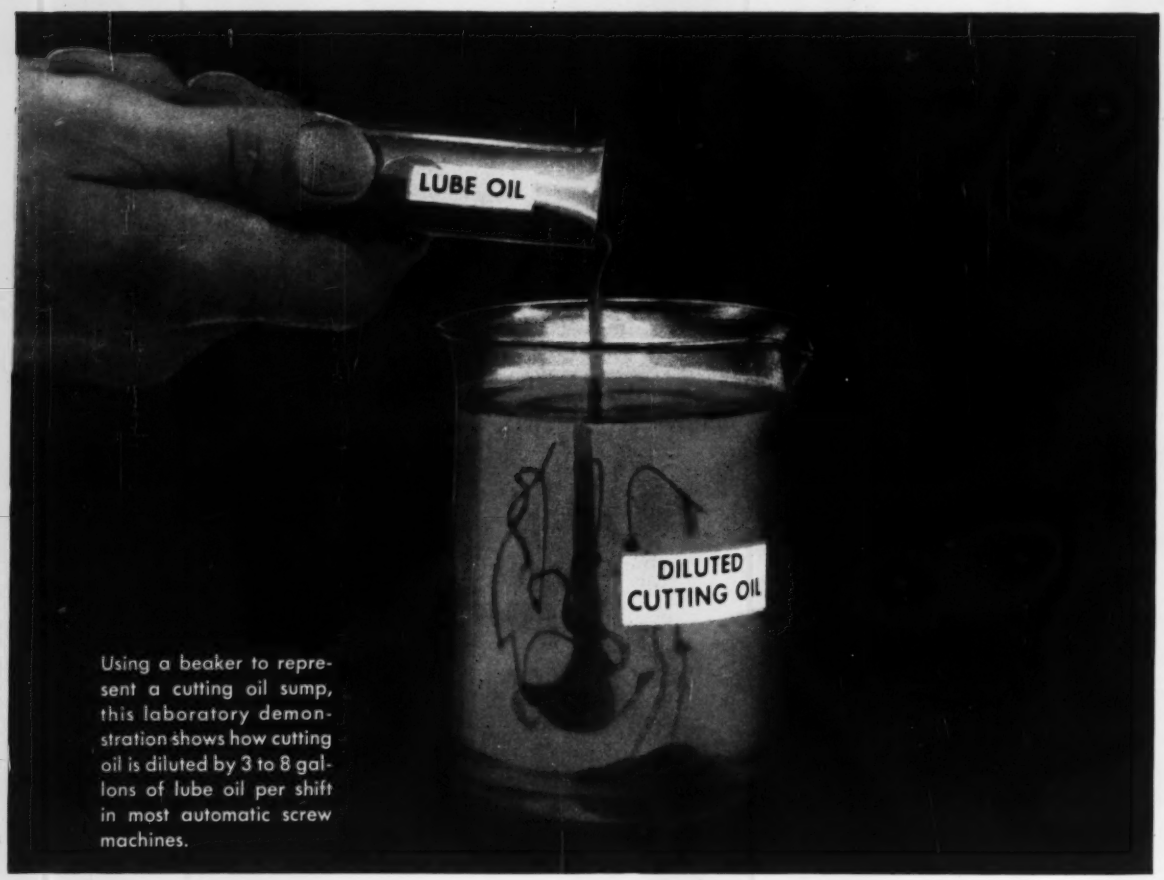

Using a beaker to represent a cutting oil sump, this laboratory demonstration shows how cutting oil is diluted by 3 to 8 gallons of lube oil per shift in most automatic screw machines.

It happens in 7 out of 10 automatics!

Diluted cutting oil can cut output 33%

No matter how careful your lubricating techniques, you still can't stop lube oil from leaking into the cutting oil sump on 70% of automatic screw machines. As cutting oil is diluted, it loses strength—ingredients that make it efficient become less and less effective. The natural consequence is shortened tool life, more downtime and a higher percentage of rejects.

Texaco Cleartex can end this problem forever. All you have to do is use Cleartex for both cutting *and* lubrication . . . and watch your production rise. The exceptional chemical stability and load-carrying ability of the Cleartex series make them equally suitable for use as cutting oils, lubricants and hydraulic fluids. (70% of all automatic screw machines can benefit from the "Cleartex Cure!")

TAKE THE CLEARTEX CURE SOON!

Write today for your copy of Texaco's new booklet—"Cleartex in Automatic Screw Machines." This new illustrated guide will fill you in on the details, show you where you may be losing profits and how to avoid it . . . Or contact your local Texaco Lubrication Engineer soon for an authoritative survey of your automatics. Just call the nearest of more than 2,000 Texaco Distributing Plants, or write to The Texas Company, 135 East 42nd Street, New York 17, New York. Dept. S-FM-10.

TUNE IN...Metropolitan Opera Radio Broadcasts Every Saturday Afternoon

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

This Week in STEEL The Metalworking Weekly

January 19, 1959
Vol. 144 No. 3

EDITORIAL 25

Soon you may have to decide whether and how you will want to help Mikoyan get what he really wants.

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Convair

Why explosive forming works is explained by three authorities in this field. In the photo, a basic work form is about to be placed at the bottom of a water tank for an experiment in Dynaforming.

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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FIRST

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EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

58-51

behind the scenes

Beer Can Saga

The first time we entered Golden, Colo., we were wrapped in a uniform issued by our beloved Republic and accompanied by three other escapees from nearby Lowry Field. There had been much talk among our fellow warriors about the pure spring water and sparkling mountain streams in the vicinity of Golden, and it made us thirsty. Of course, it was mentioned in passing that the Adolph Coors Co. operated a big brewery in Golden, where they transmuted the widely advertised pure spring water into beer, but this intelligence didn't interest us. Indeed, we didn't care if Coors put their beer into ballast tanks or paper bags, so long as we were financially able to belly up to a bar and personally test the miraculous pure spring water.

However, if we weren't interested, the Coors people were—interested in what they put their beer into, that is. Historically, beer has been poured into stone jugs, ceramic crocks, wooden tubs, glass bottles, and tin cans, but Coors wanted to package it in aluminum cans. They may have been thinking about it on the same day that we prowled about their Golden brewery—and now, by cracky, they've done it. Their success in the tricky business of "aluminuming" their beer instead of "tinning" it represents a technological breakthrough. Machine Tool Editor Robert Huber's story about it appeared in last week's STEEL (Jan. 12, p. 70), so this is in the nature of a follow-up. Mr. Huber was kind enough to pass on some of his impressions.

Technology Goes to Mountain

"You have no idea of the difficulties Coors ran into," he said. "Every time they thought they had something, costs killed it. Technical problems alone would have baffled a brigade of Purdue engineering graduates, but they kept plugging."

"Why didn't they come East and find out how it's being done?"

"It isn't being done. Those boys worked it out all by themselves. President William Coors and his chief engineer on the aluminum can project, Jack Porterfield, finally came up with a continuous casting, impact extrusion deal that revolutionizes aluminum partmaking. You'd think a tremendous technological advance like that would have come from some gigantic industrial complex." Robert paused, twiddled his thumbs, and assumed the attitude of one stricken by wonder. "So where does this technical wonder come from?" His voice grew faint as he answered himself. "From a beer factory in the quiet foothills of the Rocky Mountains!"

Setting Management Salaries

Ah, well, no part of the world has a corner on wonders. Off the coast of Venezuela we have balloonists still on their way to a jungle they were reportedly lost in where their balloon came down before they even got there; we have ladies in Cleveland throwing stones at limousines, backed by the former practice of throwing gasoline-filled bottles at Russian tanks in Hungary—and we have a story in STEEL concerning the setting of management salaries. It begins on Page 42.

The subject of management salaries is something that you don't view lightly. Can you imagine yourself sidling up to management executives at club gatherings or cocktail parties, and inquiring in your best deadpan voice: "Say, Mac, what do you make a week?"

STEEL's examination of the subject, however, is not conducted as bluntly as that. Moreover, it is aimed at learning something about the general structure of management remuneration. A century ago the most management could expect was a fair salary and maybe a small share in the business. Today some of the fringe inducements, added together, may amount to more than the pay check.

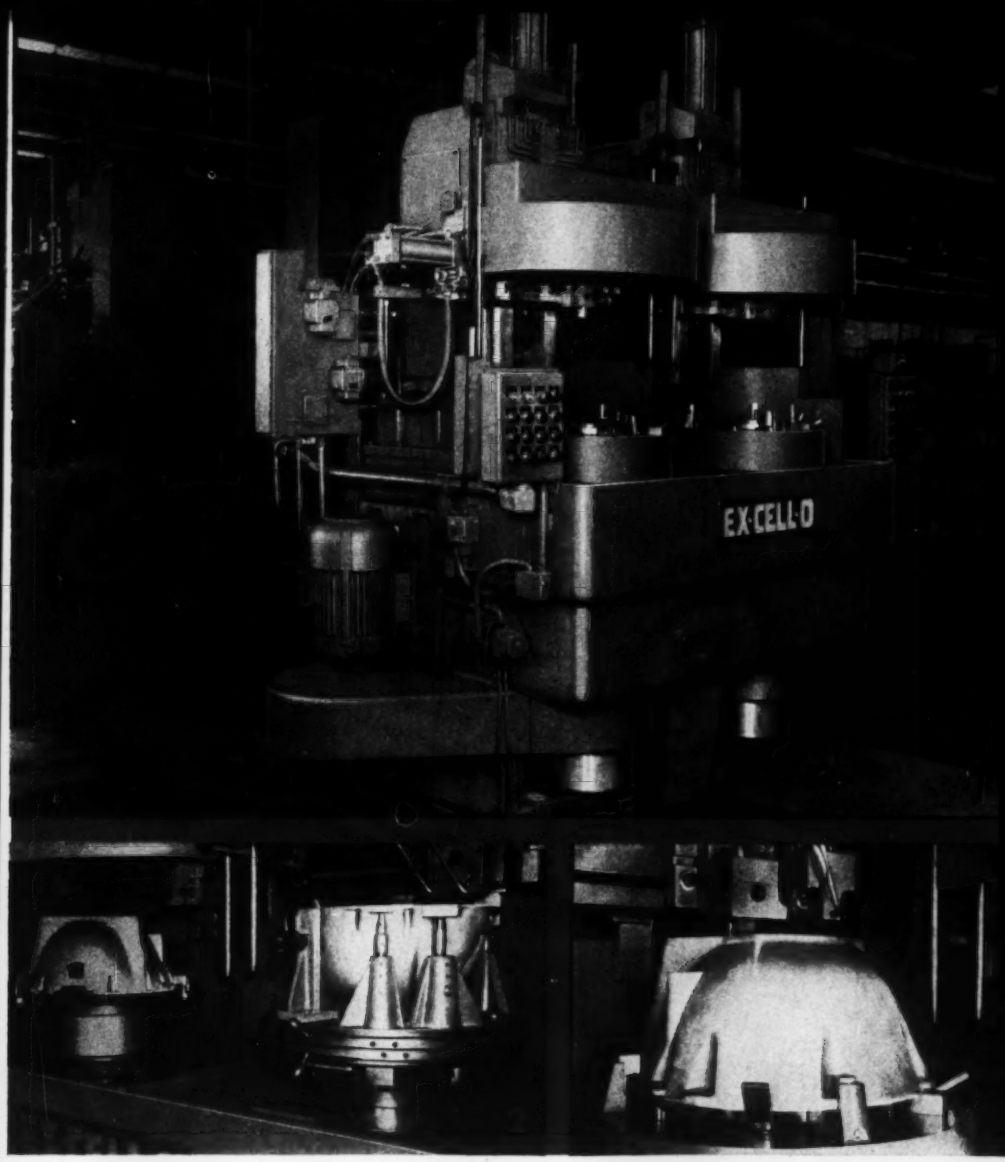
If you hire management, how should you compute the wage? If you are management, how much should you demand? If you read the article referred to, you will be in a better position to negotiate.

Mail Early Dept.

We don't expect you to turn handsprings over the fact that the 52 copies of STEEL you received last year weighed about 41½ lb, but we wouldn't be human if we didn't expect you to be impressed with the weight of useful information those 52 issues carried. Like nuts in a hickory tree, so are articles in a year of STEEL: That is, they are everywhere, but specific articles, like specific hickory nuts, are hard to find without a guide. We happen to have on hand a few stray copies of STEEL's Editorial Index for volume 142, covering issues between Jan. 1 and June 30, 1958, so if you need one, be our guest. We'll ship 'em on a first-come, first-serve basis. They contain subject, company, and author indexes (or indices, if you wish to be fussy) and represent a latter day key to metalworking scripts.

Shirdlu

(Metalworking Outlook—Page 19)



XLO

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FOR
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An overall view of the Ex-Cell-O Style 432 Duplex Vertical Machine, used for finish facing, boring and chamfering automatic transmission housings.

These are stations #1 and #2 of the first of the three Style 432 machines. Part at left is semi-finish faced, while part at right is finished on the opposite end by two tools each making one pass.

Close-up of housing during the finish face, bore and chamfer operations. Housings are permanent mold aluminum casting.

57-71

Want Higher Production...?

Here's how one auto manufacturer did it

Urged by the upswing in automatic transmission demand, one of the "Big Three" installed several Ex-Cell-O Duplex Vertical Boring Machines. The two-station units rough and finish permanent mold aluminum torque converter housings at a rate of 164 per hour! Automatically, of course. Operations performed by this Style 432: turning, boring, facing, grooving and chamfering, alone, or in any combination.

Perhaps you have a volume production operation you would like to *double* at no increase in per-unit cost? Then you'll want to find out all about Ex-Cell-O Vertical Boring Machines. Their two-station construction automatically doubles operator output. Get in touch with your local Ex-Cell-O Representative soon. Or, if you prefer, write direct to Ex-Cell-O, Detroit.

EX-CELL-O CORPORATION — *Machinery Division*

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES CUTTING TOOLS • TORQUE ACTUATORS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

INSTALL PERFORMANCE NOT PROMISES

Promised catalog ratings and actual on the job ratings are not always the same. When you install "Buffalo" Fans you can always be sure that fan *performance* will confirm your good judgment. Buffalo Forge Company's 81 year reputation for highest engineering and manufacturing standards is assurance that you will obtain fan performance to meet the *exact* requirements of each job.

FOR HIGH PRESSURE REQUIREMENTS:

Designed especially for Class III and IV construction, the "Buffalo" Type "BLH" fan will provide peak performance for your high pressure systems. It affords a mechanical efficiency of 86% over a wide range, while maintaining stability of performance from free delivery to shutoff. The "BLH" features a smooth inlet bell, directional inlet vanes, backward-curved blades and divergent outlet. These factors reduce turbulence to a minimum, and give very quiet operation. An added feature is the non-overloading characteristic. Bulletin F-201 gives complete details.

FOR MODERATE PRESSURE REQUIREMENTS:

The "Buffalo" Type "BL" Fan is an ideal choice for your Class I and II ventilating and air conditioning installations. Its high static efficiency over a broad range has been proved in hundreds of applications. The "BL" has many of the unique "Buffalo" features of the "BLH": it is non-overloading, and is designed for minimum turbulence and ultra-quiet operation. Other features are the factory-balanced wheel to minimize vibration and the wheel-contoured housing with large, correctly-shaped scroll. Write for Bulletin F-104.

Only "Buffalo" offers you the "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.

BUFFALO FORGE COMPANY
Buffalo, N. Y.

Buffalo Pumps Division • Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

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LETTERS
TO THE EDITORS

Graph Gives Quick Picture

We have found your fine magazine interesting and helpful in our activities as a supplier of rubber covered rolls to the steel industry. One of the first things we turn to each week is the Industrial Production Index. This graph gives us a quick picture of the business situation that would be difficult to get in any other way.

May we have permission to reproduce it in our monthly house organ?

Paul V. Brown
Manager
Industrial Rolls Div.
Sam'l Bingham's Son Mfg. Co.
Chicago

• *Permission granted.*

Brings Joy to Tool Designers

We noticed in a recent issue of STEEL that a revision to the "Guide for Selecting Tool Steels & Carbides" had been made Apr. 21, 1958.

Bring joy to the hearts of our 20 tool designers for the coming year by sending us whatever number of copies can be spared. We'd all appreciate it!

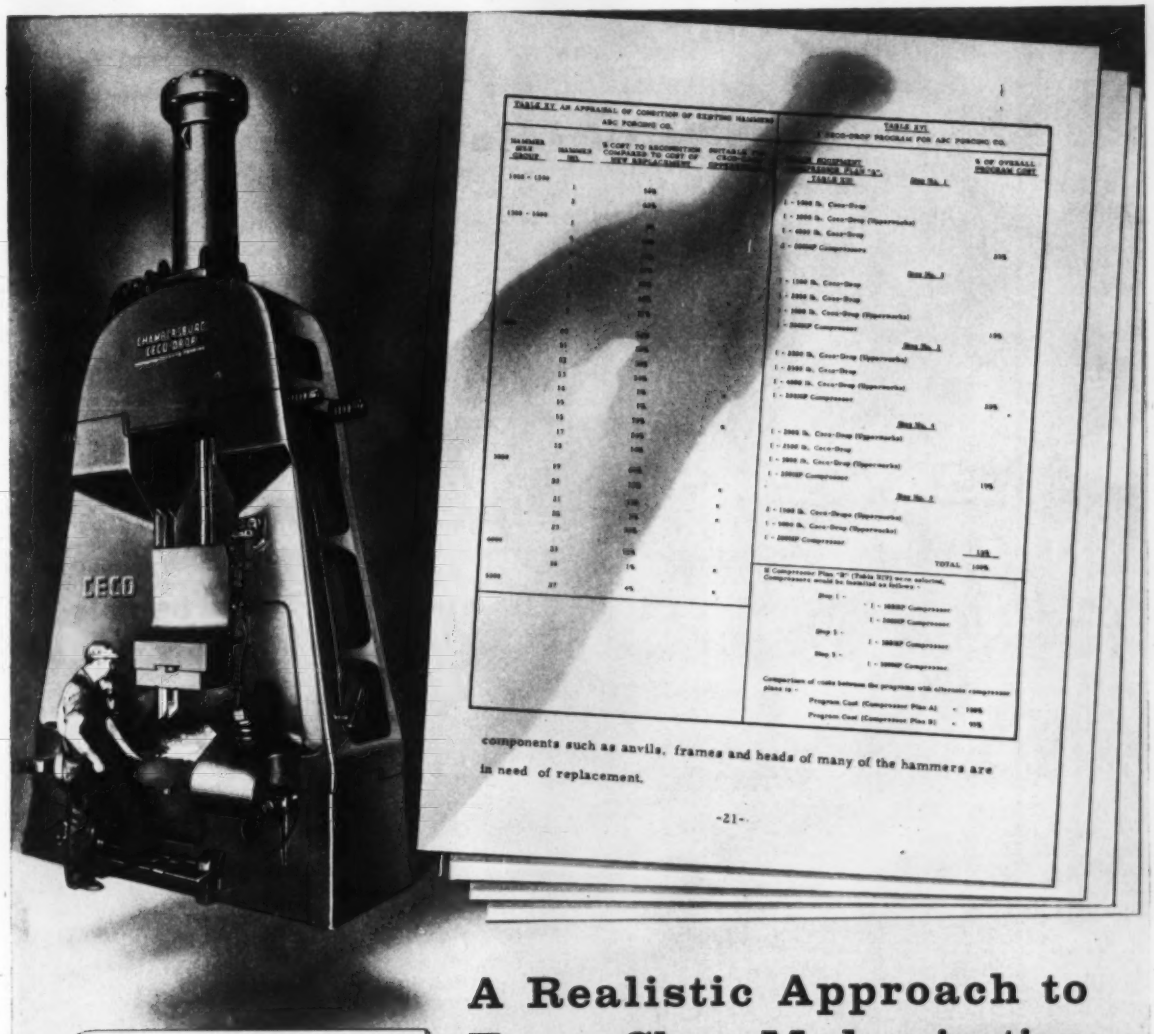
S. H. Parsons Jr.
Supervisor-Tool Design
Marquardt Aircraft Co.
Ogden, Utah

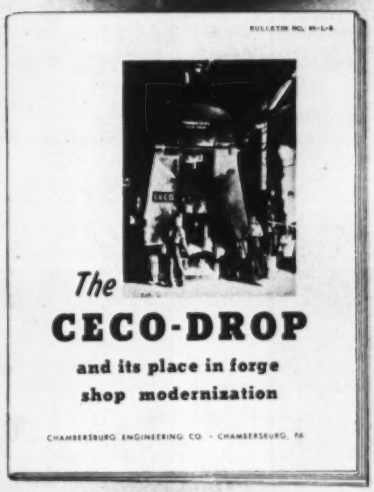
Defends Semitubular Rivets

I was pleased to see "Aluminum Rivets Upgrade Parts Made of Aluminum" by Floyd A. Lewis, technical secretary, Aluminum Association, New York (Dec. 1, 1958, p. 86). My compliments to you for including this article in the publication.

However, I must take exception to the final portion which refers to semitubular rivets. This part of the article indicates that a semitubular rivet is a blind rivet available in several designs for blind riveting, where the work can be reached only from one side. This is not true. A semitubular rivet has a hole in the end to permit the metal to be rolled over on an anvil to a smooth circular clinch. The rivet is driven on one side of the workpiece against an anvil on the opposite

(Please turn to Page 12)

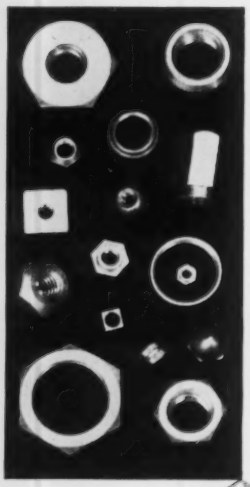




A Realistic Approach to Forge Shop Modernization

During the past few years, mounting competition has caused forge shop managers to seek ways to further increase production and reduce costs. A number have scrapped their old board hammers replacing them with Ceco-Drops, the modern piston-lift gravity-drop hammer. These shops have thus placed themselves in a position to get more business—and they are getting it! ● A wealth of helpful information is available in Chambersburg's new 28 page forge shop modernization bulletin. Based on studies made in prominent forge shops, this publication assists you to formulate your own step-by-step modernization program. Write for a copy today.

CHAMBERSBURG ENGINEERING COMPANY · · CHAMBERSBURG, PA.



Special precision nuts are not "off-the-shelf" items. Whether standard or miniature in size, they require *special* engineering, production facilities and quality controls.

As the leading manufacturer of *turned* brass and aluminum nuts, Fischer can supply a complete range of types and sizes to meet specialized requirements . . . including miniaturization.

Whatever your application, if you are looking for extreme accuracy and prompt delivery at competitive prices . . . let Fischer quote your next order.

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TURNED NUTS Fischer SPECIAL MFG. CO. CINCINNATI OHIO SINCE 1906

8287-FS

LETTERS

(Concluded from Page 10)

and, therefore, there must be an access to both sides.

The next paragraph shows a relationship between the hole size in the workpiece and the strength of a semitubular rivet in resisting shear and tensile stresses. There is no difference between the relationship of hole size to shear resistance of a semitubular rivet and that of a solid rivet.

Mr. Lewis also states that a semitubular rivet will not resist shear as well as solid rivets. Again, this is not true. A semitubular rivet is solid except for a shallow hole in the end. When a semitubular rivet is set, the hole disappears and only the solid portion of the rivet remains in the work.

This might have been an oversight on Mr. Lewis' part inasmuch as he included both tension and shear stresses in one sentence. If he had separated these two, I can agree to his statement that in tension a solid rivet is stronger than a semitubular rivet of the same alloy and size, but I cannot agree that in shear there is any difference in the strengths of a semitubular and solid rivet of the same alloy and size.

Daniel W. Schluter
Manager-Advertising & Market Research
Tubular Rivet & Stud Co.
Quincy, Mass.

• STEEL *erred in stating that a semitubular rivet can be used as a blind rivet and in inserting "hole" into Mr. Lewis' copy. Mr. Lewis, however, clearly states that as part of an assembly semitubular rivets are not as strong either in tension or shear as solid rivets of the same alloy and size.*

Requests Writeoff Information

A reference is made to a booklet published by Machinery & Allied Products Institute in "Faster Writeoff Allowed" (Nov. 24, 1958, p. 59). We would like to obtain a copy of the booklet and would appreciate the address of the institute.

John C. Smack
Staff Assistant to General Manager
Industrial & Scientific Products Div.
Curtiss-Wright Corp.
Princeton, N. J.

• *MAPI's address is* 1200 *18th St. N.W., Washington* 6, *D. C.*

Wants Article for Market Course

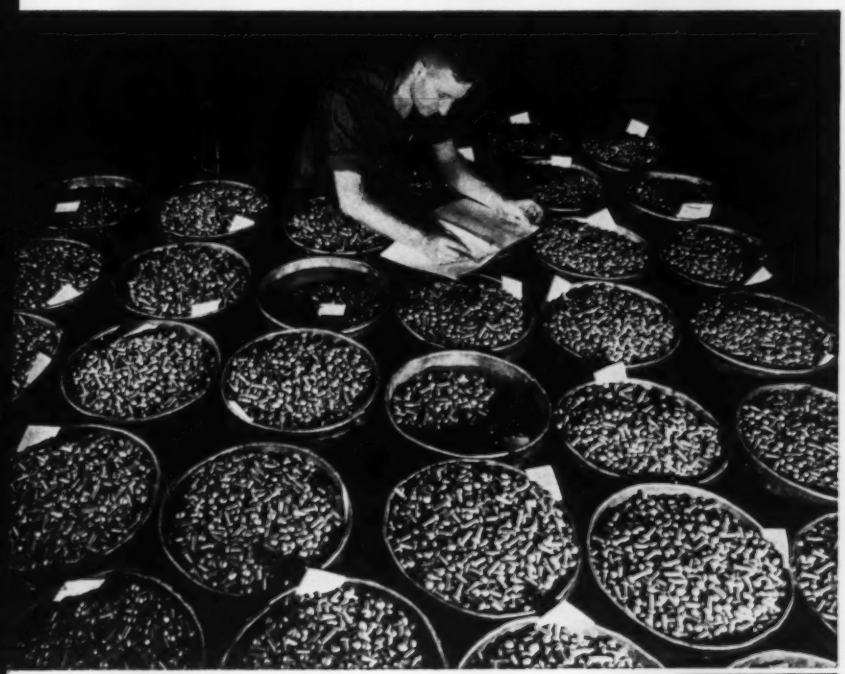
I would like to distribute reprints of your excellent article, "Pricing for Profit" (June 16, 1958, p. 87) to my students in a course in marketing at Carnegie Tech Evening School because the article summarizes so well the problems and some management thinking in this area. May I have 28 copies for this use?

Richard W. Deckmann
New Products Development
Paint & Brush Div.
Pittsburgh Plate Glass Co.
Pittsburgh

Thousands of rivets or blanks for cold headed Brainard Specials are produced in only minutes (3½ million pieces daily) on this battery of modern cold headers from Youngstown Rivet Quality Wire.

Accent on excellence

Youngstown solid rivet wire



Brainard Rivet Company of Girard, Ohio, daily produces rivets "by the millions". But they realize a rivet is only a rivet—so quality and fast, dependable service are the products they're really selling.

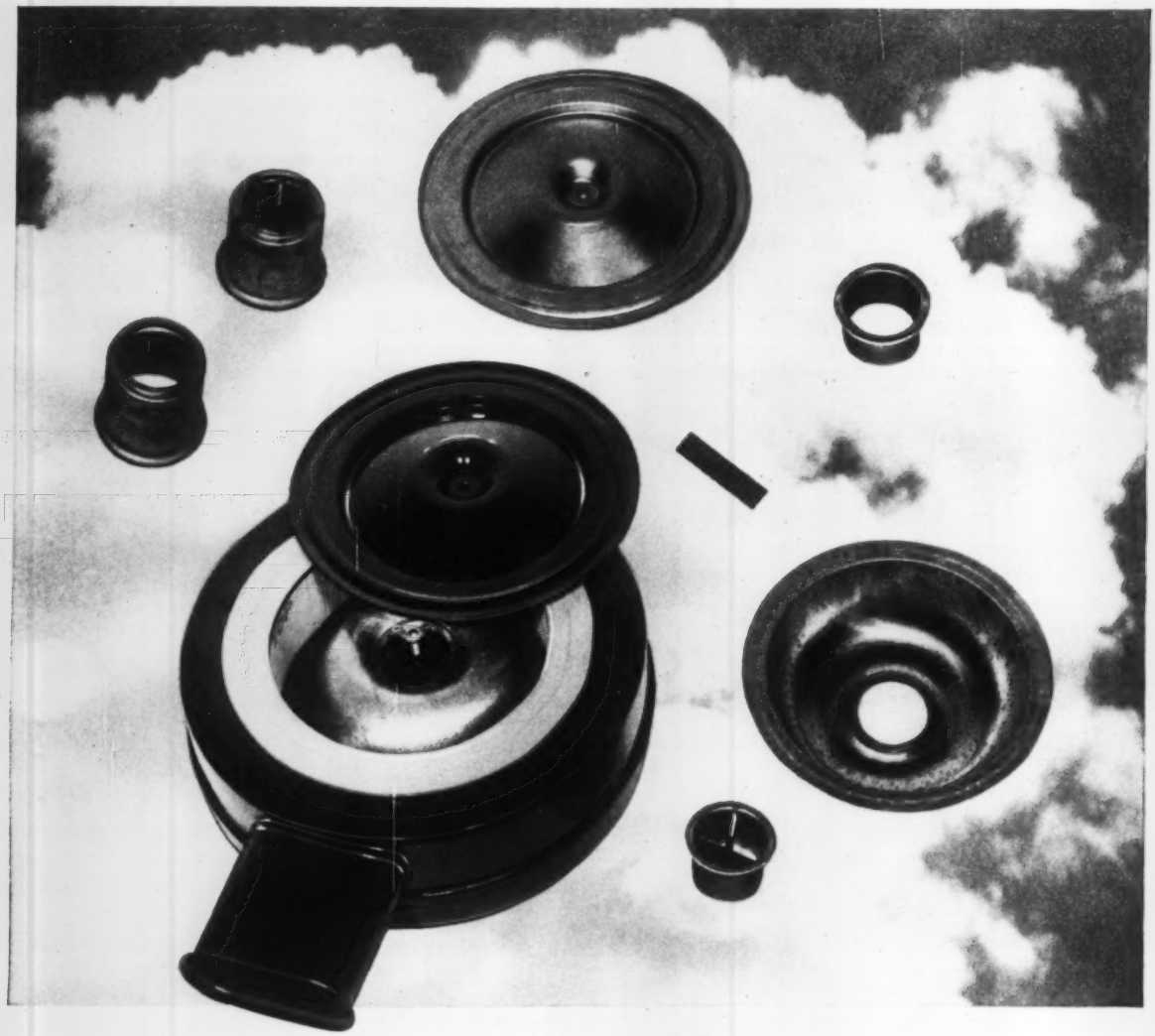
To help in maintaining Brainard's high product quality on a steady, dependable production basis is Youngstown's Solid Rivet Quality Wire. It is free of all injurious seams and inclusions which guarantees long, trouble-free production runs on Brainard's cold headers.

Wherever steel becomes a part of things *you* make, the high standards of Youngstown *quality*, the personal touch in Youngstown *service* will help you create products with an "accent on excellence".

QUALITY · YOUNGSTOWN · SERVICE

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel, Youngstown, Ohio



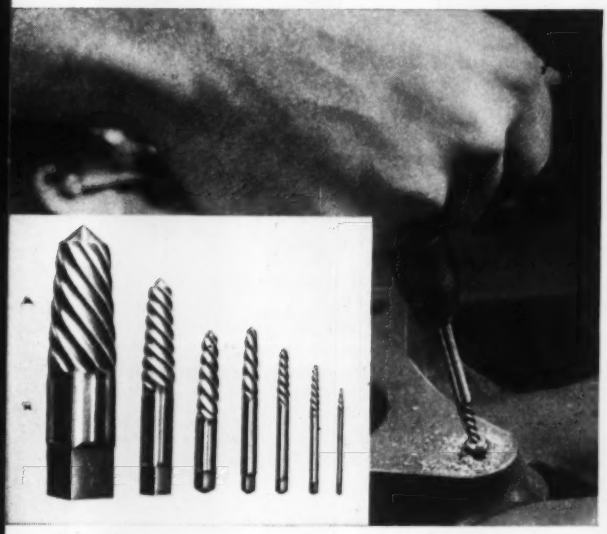
Used for Interior Parts of Fram Air Cleaners...

REPUBLIC TERNE PLATE ASSURES FILTER-FRESH AIR SUPPLY

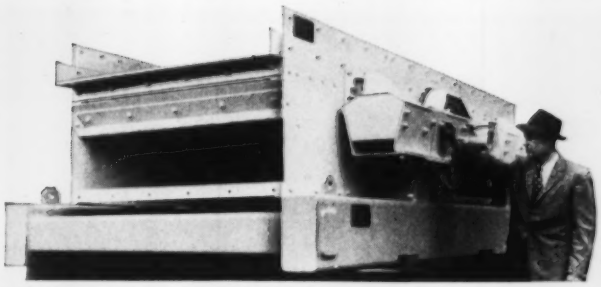
Efficient removal of airborne dust is the primary function of carburetor air cleaners manufactured by the Fram Corporation, Birmingham, Alabama. And, to make sure the cleaned air stays clean as it enters the carburetor, Fram uses Republic Terne Plate for vital interior parts. The tight, uniform, lead-tin coating on this material guards against formation of rust particles which might enter and block fine carburetor jets. As a result, a potential source of trouble in the carburetor system is eliminated.

Equally important, from Fram's standpoint, is the excellent workability of Republic Terne Plate. The parts for which it is used – inner primary plate, center tube, carburetor tube, and cover plate – require severe fabricating operations. The 2¾" diameter, 2¾" deep center tube, for example, is drawn from a 6¾" circular flat blank. The cover plate is "hemmed" around the perimeter to produce a double thickness. Republic Terne Plate withstands these and other punishing operations with no cracking or flaking of the coating or loss of its ability to fight corrosion. In addition, the coating requires no preparation to provide an excellent base for painting.

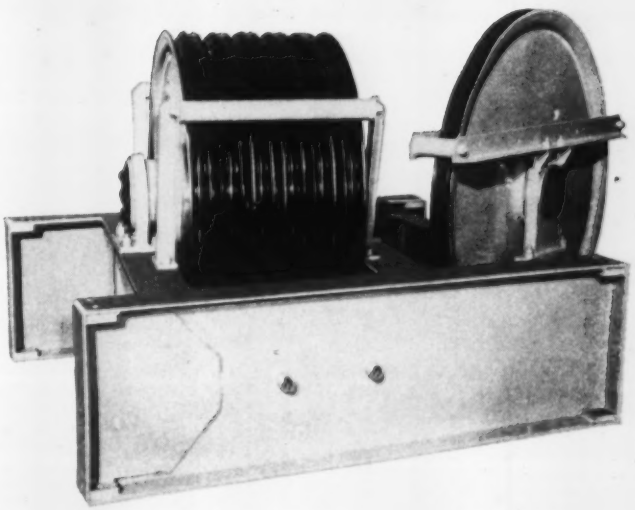
It will pay you to consider all of the advantages of Republic Terne Plate in relation to your own sheet steel product service and manufacturing requirements. For complete information, contact your nearest Republic office, or send coupon.



QUALITY AND ECONOMY ARE ASSURED in screw extractors made of Republic Cold Drawn Leaded Alloy Steel by the Henry L. Hanson Company, Worcester, Massachusetts. Beneficial characteristics of this versatile material include high machinability, formability, hardenability, and toughness. As a result, screw extractors can be produced faster and at less cost than was possible with former materials and, after scientific heat treatment, are practically unbreakable. Republic Cold Finished Alloy Steels are available in every standard analysis, plus many specials. Mail coupon for further information.



FINE-THREAD REPUBLIC CAP SCREWS of several different steel analyses are used for assembly of major components in Ty-Rock Vibrating Screens, built by the W. S. Tyler Co., Cleveland, Ohio. Use of these fasteners enables Tyler to distribute loads better and eliminate danger of fatigue failure due to vibration and cyclic loading. Republic produces more than 20,000 standard and 8,000 special types and sizes of fastener products to meet a wide variety of production and product requirements. Send coupon for details.



ASSURANCE OF STRENGTH WITHOUT EXCESS WEIGHT is a major reason why the Lee C. Moore Corporation, Tulsa, Oklahoma, uses Republic 4150 Hot Rolled Alloy Steel for shafting in cantilever mast crown blocks. Shafting must be able to absorb shocks and impact without failure while carrying massive weights of drill pipe. Location of the crown block in the top of the rig makes light weight vital. And yet operating safety is of paramount importance. Republic Alloy Steel meets all of these requirements and provides high abrasion and fatigue resistance as well. Republic Alloy Steels provide strength, safety, and economy in thousands of product applications throughout industry. For complete data, mail coupon.

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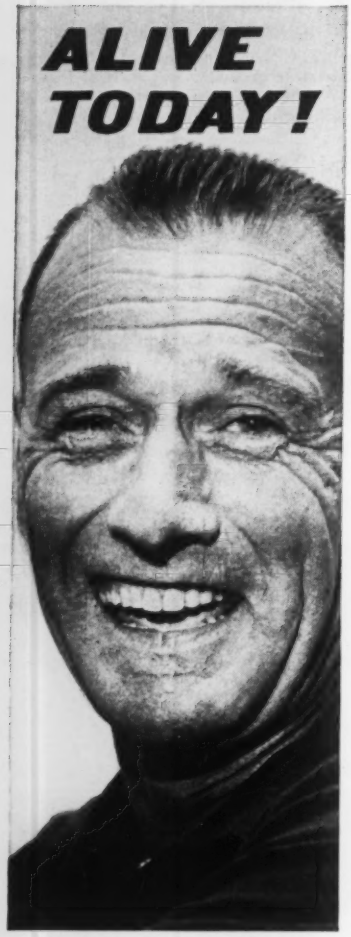

Arch Lightbody, like 800,000 other Americans, is cured of cancer. Like 800,000 other Americans he went to his doctor **in time**—in time for early diagnosis and prompt and successful treatment. He learned that many cancers are curable if detected in time.

You can do two things to defeat cancer: Have an annual health checkup. Be alert to the 7 danger signals that could mean cancer:

1. Unusual bleeding or discharge. 2. A lump or thickening in the breast or elsewhere. 3 A sore that does not heal. 4. Change in bowel or bladder habits. 5. Hoarseness or cough. 6. Indigestion or difficulty in swallowing. 7. Change in a wart or mole. If your signal lasts longer than two weeks, go to your doctor to learn if it means cancer.

AMERICAN CANCER SOCIETY

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If stainless strip is part of your product, consider using Crucible stainless. Crucible precision-rolls it to your exact specifications — produces finishes that are surpassingly lustrous. And Crucible's painstaking methods ensure uniform metallurgical quality as well as gauge uniformity in coil after coil. Why not obtain these combined qualities next time you need stainless? Crucible stainless is available in all gauges down to .010" and in all widths. Write to *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

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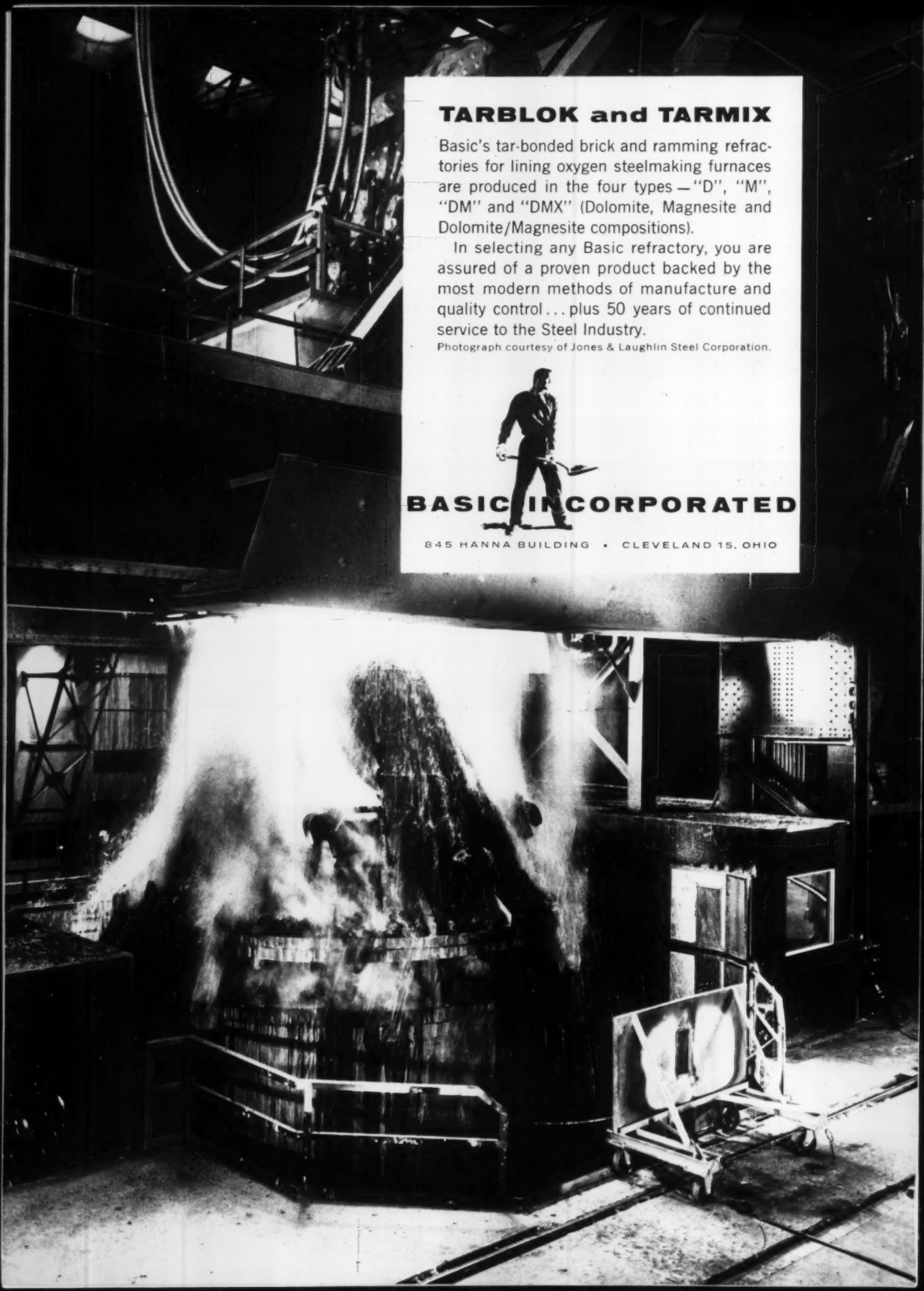

TARBLOK and TARMIX

Basic's tar-bonded brick and ramming refractories for lining oxygen steelmaking furnaces are produced in the four types — "D", "M", "DM" and "DMX" (Dolomite, Magnesite and Dolomite/Magnesite compositions).

In selecting any Basic refractory, you are assured of a proven product backed by the most modern methods of manufacture and quality control... plus 50 years of continued service to the Steel Industry.

Photograph courtesy of Jones & Laughlin Steel Corporation.

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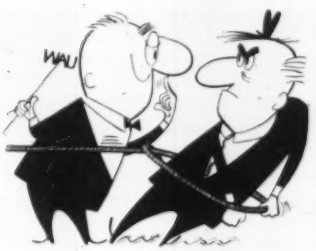
UAW Will Get Tough Next Half



Expect UAW locals to adopt a more adamant attitude after June. They're comparatively lenient now. If yours is one of the more than 1000 firms whose UAW contracts expired last year or will expire this year, you stand a fairly good chance of settling for less than the Big Three carmakers. Annual improvement factors, cost of living, vacations, and pensions are hotspots (Page 28).

Court Gives Unions New Weapon

Michigan's Supreme Court ruled that Ford UAW workers in the Detroit area are eligible for state unemployment compensation if they're laid off because of strikes in out-of-state Ford plants. (Nine other states have similar laws.) Ford may appeal the case to the U. S. Supreme Court. If the decision stands, unions have a potent new bargaining weapon. They won't have to build up large strike funds to tap in case of a strike at a small, but crucial, out-of-state supplier. All Big Three carmakers have such venders.

Automakers Will Use More Aluminum

The auto industry will use 283 million lb of aluminum this year if 5.5 million cars are built, predicts Aluminum Co. of America. It reports the average '59 car contains 51.58 lb of the light metal (vs. 47.3 last year and 40.5 in '57). Alcoa estimates trim requirements will rise 11.1 per cent—to 10 lb per car. The Imperial uses the most aluminum—99.67 lb.

Optical Goods: Growing Market, Strengthening Supplier

Watch for new developments in optical goods that could save you money in production and inspection operations. And take a close look at that industry as a growing market for your products. It's a fair-sized buyer of machine tools, fasteners, stampings, aluminum, and ferrous metal products. The industry's sales rose last year to about $166 million (vs. $158.3 million in '57), may reach $186 million this year (Page 33). Price competition from abroad is a problem.

A-Plane May Be Budget Buster

Here's another battle President Eisenhower and conservative congressmen will have to fight to keep the budget from expanding: Mounting pressure to pour more money into our nuclear plane program. Rep. Melvin Price (D., Ill.) got into the thick of the battle by reporting that the U. S. is

three to five years behind the Soviets in this field. Representative Price, who heads the R&D subcommittee of the Joint Committee on Atomic Energy, said he doesn't think the Reds are flying an A-plane now but he believes they're "well down the road in their program" which "underlines the importance" of the U. S. hiking the financial support of its program.

Interest in Explosive Forming Zooms

Watch for interest in explosive forming to climb from glowing to red hot. The process will elongate carbon steel 70 per cent (vs. the normal limit of 42 per cent), harden aluminum 95 per cent without changing its size, shape defiant refractory metals, and perform other feats. Intrigued readers have asked: "How does it work?" The answer is on Page 62.

Look West, Metalworking Marketer

Keep your eye on the West as a market for your products. The population of the 11 western states is expected to grow 37 per cent by 1970. California's population will climb even more. Immediate prospects are nearly as good: The seven Far Western states should consume 10 per cent more steel this year than last.

Peak Steel Earnings Forecast

"Judicious capital expenditures" will result in "record earnings for some large steel companies this year," predicts Theodore H. Gerken, vice president of Laird & Co., New York security analysts. "In an honest-to-goodness boom year, steel earnings should be astonishingly large," he says. He believes steelmakers' investments in efficient equipment will help offset their rising labor costs.

Are Your Management Salaries Right?

When a recession causes bonuses to evaporate, many managers discover their base pay is not commensurate with their job responsibilities. And moratoriums on merit increases often spell the loss of promising young managers. Too much emphasis on length of service for salary adjustments can cause trouble at any time. The answer to these problems is better salary administration. Taking a look at the procedure in other companies can help you (Page 42).

All Sales Signs Point Up

Sales of major appliances should be 7 per cent higher this year than last, predicts Herman F. Lehman, general manager of GM's Frigidaire Div., Day-

ton, Ohio . . . Material handling equipment sales this year will exceed last year's by 10 per cent, says Material Handling Institute . . . November, 1958, orders for screw machine products were 30 per cent better than those in the year-earlier month . . . Sales of closed circuit TV equipment will increase more than sixfold in the coming decade, estimates William J. Morlock, general manager of General Electric's Technical Products Dept.

"Do-It Yourself" Politics Needed

Businessmen have to "become interested in politics beyond the edge of your newspaper and the flap of your wallet," warns Clarence O. Hamilton, executive vice president, Hamilton Cosco Inc., Columbus, Ind. He says businessmen should: 1. Join a political party. 2. Offer their services to county chairmen and precinct committeemen. 3. Get to know elected officials. 4. Assign someone in the company to keep posted on local, state, and federal developments. 5. Encourage qualified people to seek public office.

235.2 Million Buyers by 1975

You can readjust your long range market planning in the light of a new estimate by the Census Bureau. It predicts the U. S. population will hit 235.2 million by 1975. That's 13.7 million more than the bureau estimated in 1955 and 21.6 million above the 1953 estimate. This sharp and continued upturn in projections is worth considering in making plans for expansion and in projecting your R&D expenditures. It signals metalworking sales of $372 billion in 1975 (vs. $135 billion this year) and steel production of nearly 250 million tons (Page 39).

How To Prevent Underfilm Corrosion

A new cold phosphating process may solve your underfilm corrosion problems: Corrosive attack under the paint film which starts even before sandblasting or wire brushing is completed. The new process, developed in England, is proving its merits on tanks, piping, and other products (Page 66).

Plastics May Corner Boat Market

Reinforced plastics will claim half the small boat market in less than ten years, predict members of the Society of the Plastics Industry. About 72,000 reinforced plastic boats were built last year—taking about 37 million lb of the material. SPI reports that all 50-ft-and-under Navy boats will be made of reinforced plastic.

European Steel Capacity Reconcentrates

Completion of two moves now underway would reconcentrate West German coal and steel industries along pre-World War II lines. The two deals: 1. Consolidation of Huetten-und Bergwerke Rheinhausen (the Ruhr's No. 2 steel giant wholly owned by Alfried Krupp) and Bochumer Verein

with 1.6 million tons of steel capacity). It has been approved by the High Authority of the Western European Coal & Steel Community. 2. August-Thyssen (West Germany's biggest steel producer) is asking the High Authority's permission to acquire controlling interest in Phoenix Rheinrohr Steel Co.

Ike Moves Farther to the Right

President Eisenhower has firmly committed the last two years of his administration to a policy of conservatism. He thinks a balanced budget is the nation's best weapon against inflation (Page 36). And he seems determined to fight hard to keep liberal congressmen from tacking extra billions onto his $77 billion request.

Scrapmen Fight To Hold Markets

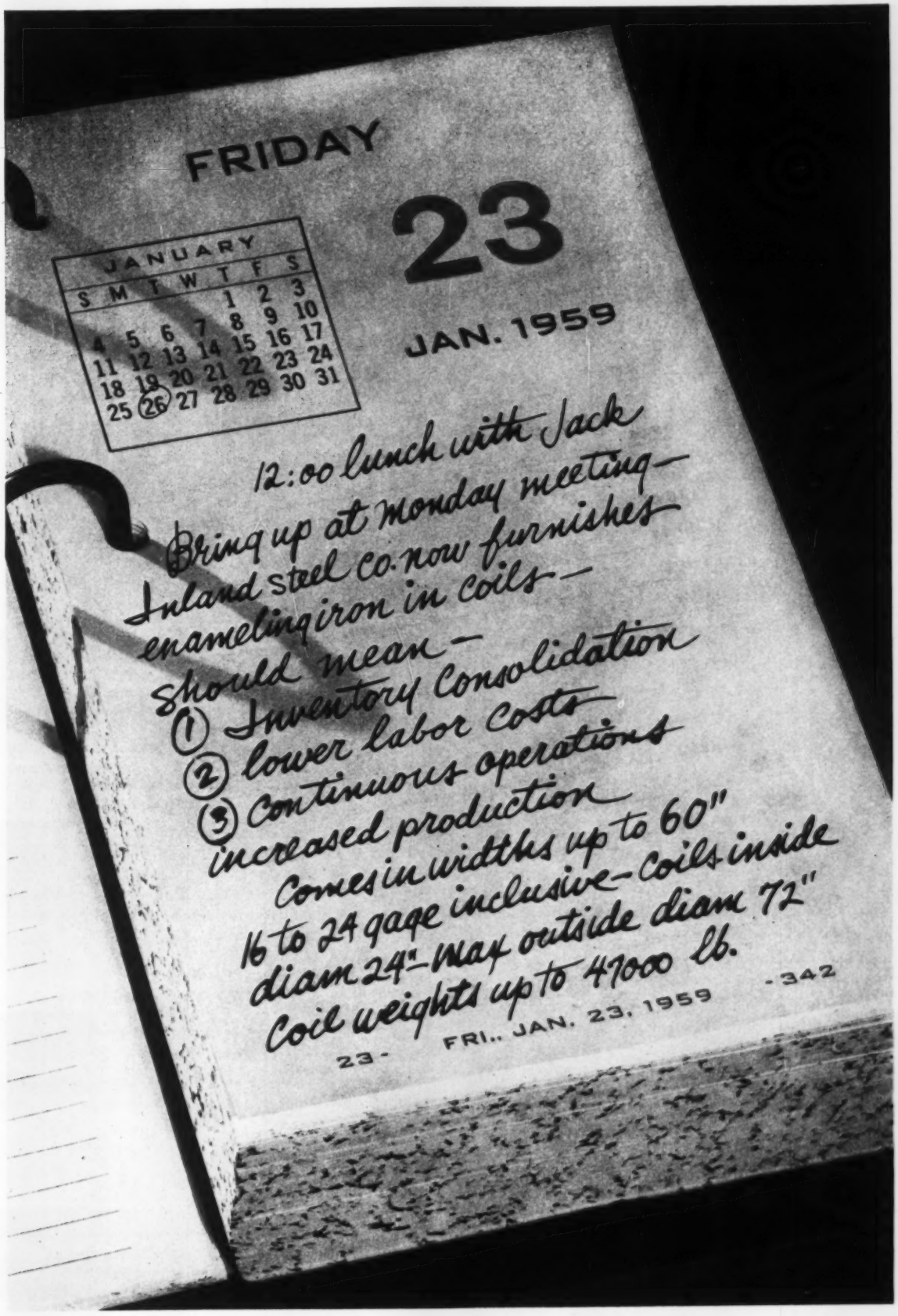
Scrapmen must act quickly to escape marginal status in the economy, warned speakers at the Institute of Scrap Iron & Steel meeting in New York last week. Technological advances in the steel industry are depressing scrap markets. Consumption of purchased (open market) scrap fell from 29.6 million tons in 1957 to 22 million tons last year (Page 32).

Westinghouse Unveils Thermoelectric Appliances

Westinghouse is building prototype appliances based on thermoelectricity which creates cold directly from electricity. A refrigerator that has no moving parts and a dehumidifier have been made so far. Westinghouse claims the refrigerator operates "without noise or vibration."

Straws in the Wind

Expect the Ohio legislature to legalize SUB payments this session . . . Employment in the durable goods industries is about one-third of the way back to the prerecession level . . . Ford Motor Co. will substantially increase its British Ford imports . . . Buick built its 2 millionth hardtop last week . . . The UAW will trim $425,000 more from its operating budget to get back in the black . . . Aluminum Co. of America announced a new thin wall seamless pipe to compete with tubular steel products . . . Some Chrysler Corp. assembly plants will be forced to shut down today if the Pittsburgh Plate Glass Co. strike hasn't ended. At press time, the company and union still had major differences . . . A De Soto dream car would be powered by an electrochemical system . . . International Harvester's 37,500 strike-idled employees are scheduled to go back to work today. A new pact with the UAW calls for an 18-cent wage hike over three years, liberalized pension, SUB, and health-welfare plans.


FRIDAY
23
JAN. 1959
JANUARY
S M T W T F S
1 2 3
4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
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12:00 lunch with Jack
Bring up at Monday meeting—
Inland steel Co. now furnishes
enameling iron in coils—
should mean—
① Inventory Consolidation
② lower labor costs
③ Continuous operations
increased production
Comes in widths up to 60"
16 to 24 gage inclusive—Coils inside
diam 24"—Max outside diam 72"
Coil weights up to 47000 lb.
-342
23- FRI., JAN. 23, 1959

New steels are born at Armco

Only Armco Cold-Rolled Steel Specified
For Deep-Drawn G. E. Cleaner Casing

General Electric consistently specifies sheet coils of .032", Armco Cold-Rolled Drawing Quality Special Killed Steel for the deep-drawn top half of the casing on canister-type vacuum cleaner models. These units are produced at G.E.'s Vacuum Cleaner Department, Housewares and Radio Receiver Division, Cleveland, Ohio.

Whether painted or plated, the top half of the casing on every General Electric canister-type vacuum cleaner is fabricated from Armco Cold-Rolled Steel. Here's why, in the words of G.E.'s steel buyer:

"Armco Cold-Rolled performance has proven through trial to be superior through a lower percentage of surface defects plus excellent drawing quality."

Despite the severe draw, rejects are extremely low because of the consistently excellent drawing quality of Armco Cold-Rolled Steel. Superior surface and uniform grain structure minimize defects in painting and plating.

In addition, use of one grade for both painted and plated parts simplifies inventory, while use of steel in coils speeds production.

Special Steels for every need

Cold-rolled is only one of a wide range of Armco Special Steels processed to meet specific product needs. An Armco representative will be happy to consult with you about selection of Armco Steels for your requirements. Just call your nearby Armco Sales Office or write us. Armco Steel Corporation, 1199 Curtis Street, Middletown, Ohio.

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What Mikoyan Really Wants!

In lunching with Anastas I. Mikoyan, the Soviet Union's first deputy premier, and a small group of businessmen as the guest of Industrialist Cyrus Eaton, most of us shared this question:

"What does Mikoyan really want to accomplish in the U. S.?"

Mikoyan, of course, gave no direct answer. It wasn't necessary.

Ostensibly, he is on a vacation trip. Actually, as Khrushchev's righthand man and the Soviet Union's top trade strategist, the wily Armenian is using the informal approach as a subtle means of carrying out two assignments:

1. To soften the tension arising from Khrushchev's get-tough policy in Berlin.

2. To warm up a proposal Khrushchev made to Eisenhower last year. He wants a large scale trade agreement designed to help speed up the Soviet Union's industrial expansion program.

In fact, there is well founded speculation that Khrushchev and Mikoyan deliberately created the Berlin crisis as a means of inducing the U. S. to sign a trade pact.

Even though the USSR is ahead of the U. S. in the space race, its rate of industrial expansion has not satisfied Soviet planners. The sixth 5-year plan was dropped for a seven-year plan (1959-65), which is scheduled for approval at the Communist Party Congress next week.

The Soviets want our industrial equipment, especially for the production of chemicals, synthetic rubber, synthetic fibers, textiles, leather footwear, food products, television equipment, packaging materials, and building products.

They also want pumps and compressors, mining machinery, refrigerating plants, air conditioning equipment, pipe for gas lines, and steel sheets and strip, as well as licenses for production processes and engineering assistance.

Mikoyan says that Soviet exports of $4.5 billion a year include $1.5 billion in products that the U. S. can use, such as iron, manganese, and chrome ores, ferrous alloys, wood products, and industrial equipment. He claims charges of Soviet dumping are unwarranted.

The door to freer trade has already been opened a crack. The U. S. will construct a building in Moscow where it will display industrial products this summer. The USSR will have a similar display in the New York Coliseum. The Department of Commerce has also issued the Soviets a license to buy 20,000 tons of wide, cold-rolled steel strip from a U. S. company. In turn, an American ferroalloy producer is getting 80,000 tons of Soviet chrome ore.

The door may swing wider even though demands for long term credits could be a problem.

Then you will have to decide whether you will want to help Mikoyan get what he really wants. The question of "how" must also be considered.

Irwin H. Such

EDITOR-IN-CHIEF

A new problem facing steel users today

The danger of losing money by relaxing inventory controls

When the slump set in last year, big inventories were one of the toughest problems for most companies.

Now, as the economy swings back, these problems may seem to have disappeared. Actually, the problems of inventory cost and risk are always with us—just as much a threat to profit in good times as in bad.

But with the urgency of strict economies reduced, there is a very real danger that many companies will be caught off guard—a danger that recession-born practices will be abandoned as temporary emergency measures without careful enough analysis of their profit potential.

For example, companies that modified their steel inventory policies to avoid long-term commitments found that many costs were reduced and their needs better served. By taking advantage of the stocks offered by steel-service centers, these companies were able to release working capital for more productive purposes, free valuable storage space, reduce handling costs and lower scrap losses, insurance, taxes, etc.

Proof in dollars and cents

Those who carefully weighed all the advantages found reason for a *permanent* modification of their previous buying practices. They proved to themselves that they could and should rely much more heavily on steel-service centers because it makes sense in dollars and cents.

This conclusion is especially sound when you consider the unusually broad scope of Ryerson stocks and the speed and dependability of Ryerson services. Any kind, shape and size of steel can be shipped to you from Ryerson in a matter of hours. And your steel can be furnished in ready-to-use form, saving time and initial-cutting cost. You gain complete flexibility to meet quick shifts in production schedules. And you have the added assurance of getting steel of uniform, high quality—the unequalled dependability of Ryerson *certified* quality.

Your Ryerson representative is well qualified to review the facts and help you get the maximum value for your steel buying dollars. Ask him to analyze your requirements with you the next time he calls.

What it costs to carry inventory

IRON AGE magazine says: "*A survey of eight plants shows that, for every $100 worth of materials bought, the average yearly inventorying cost is $19.37.*"

Other authorities say the real cost of steel placed in inventory for extended future use may be as high as 40% more than the invoice price.

RYERSON CERTIFIED QUALITY

RYERSON STEEL®

Member of the INLAND® Steel Family

***Principal Products:** Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metalworking machinery, etc.*

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These Firms Will Put Man in Space

PROJECT	MAJOR CONTRACTOR
X-15	North American Aviation Inc.
Dyna-Soar	Boeing Airplane Co., or Martin Co.
Atlas	Convair Div., General Dynamics Corp.
Titan	Martin Co.
Space Capsule	McDonnell Aircraft Corp. and Minneapolis-Honeywell Regulator Co.
1.5 Million Lb Thrust Engine	Rocketdyne Div., North American Aviation Inc.

Manned Spacecraft by 1960?

The latest project, McDonnell's space capsule, adds to an already formidable program. Metalworking's role in it will become bigger as additional subcontracts are let

PUT ANOTHER PIECE into the puzzle of the U. S. space program. McDonnell Aircraft Corp., St. Louis, will build "a number" of space capsules to carry men into orbit around the earth, reports the National Aeronautics & Space Administration.

Rocketdyne Div., North American Aviation Inc., Los Angeles, was chosen last month to build a rocket engine with a thrust of up to 1.5 million lb. Both contracts are parts of Mercury, our $200 million, five year, man in space program.

Initially, McDonnell's space capsule will be fitted to an ICBM. The firm has received a tentative contract for $15 million, and a deadline around the end of 1960. The cost includes subsystems. Minneapolis-Honeywell Regulator Co., Minneapolis, will build the stabilizers and control systems.

McDonnell's program was chosen from 12 submitted to NASA. Like most of the advanced contracts being awarded by NASA, the Advanced Research Projects Agency, and the Air Force, this one is written in terms of objectives, rather than specifications, to allow the contractor to do the job as he sees fit.

• **Materials**—The space agency reports the capsule will be fabricated mainly from titanium and nickel base alloys. Beryllium is also mentioned for the heat shield by some sources. It will return to earth blunt end first with the aid of parachutes. Retro rockets will deflect it from orbit. The capsule, comments NASA: "will be designed to withstand any known combination of acceleration, heat loads, and aerodynamic forces that might occur during boost or re-entry." The pilot will be able to control the craft manually. Automatic control from the earth will also be available. Instruments will include those to evaluate the pilot's reactions, as well as scientific instruments for space observation. The capsule will be able to orbit 100 to 150 miles above the earth.

• **Co-operation** — Mercury will be co-ordinated with Project Discoverer, ARPA's series of space probes for 1959, and Lockheed Aircraft Corp.'s Sentry program for a reconnaissance satellite. At this early date it is impossible to evaluate its relations to Dyna-Soar—the Air Force claims it will achieve first manned space flight.

Two competing teams of companies are after that contract. Dyna-Soar, from unofficial estimates, looks like a more direct step from the X-15 (a plane to fly 100 miles high this year) than Mercury.

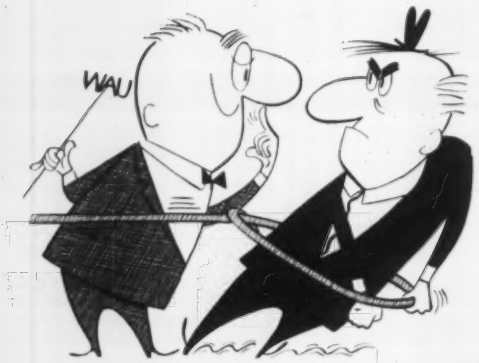
There appears to be a continued effort to divorce our military space experiments from our scientific ones. Discoverer and Mercury may be termed scientific; Sentry and Dyna-Soar are military. One thesis for Mercury's existence: Dyna-Soar is too far away (up to five years) for comfort, now that Russia has Mechta.

Titan Won't Be Dropped

The future is assured for one of the missiles that will fire McDonnell's space capsules.

"Contrary to many reports, we have no intention of curtailing or canceling the Titan program. We are proceeding as rapidly as possible with our test firing schedule," says Maj. Gen. Ben Funk, ballistic missiles center commander for the Air Force's Air Materiel Command.

He told purchasing agents in Los Angeles last week that Titan has "potentialities" which make it virtually a different kind of weapon from Atlas. Other sources reveal the AF has won the right to build 11 squadrons of the birds (perhaps ten missiles to each squadron). Nine squadrons of Atlas ICBMs are planned. The figures relate to the fiscal 1960 budget.



Smaller firms balk on SUB, pensions, improvement factor as...

UAW Rounds Up the Strays

DON'T EXPECT the UAW to win a blanket settlement from smaller companies in coming months. Local conditions are dictating terms that often differ considerably from those signed by the Big Three last fall.

Two trends stand out: 1. The union is making wide use of its double standard policy under which demands are linked to a company's economic condition. It means that a small company with an underfed treasury stands a good chance of settling for less than the UAW got from the Big Three. 2. But the UAW is looking for places to plant new demands. It means the small company must exercise extreme care to keep from becoming a guinea pig and precedent setter for future UAW demands.

The UAW denies it's having trouble getting companies to match the Big Three pattern. It says 17 of 23 shops in the Detroit area, each employing 500 or more, have settled for "essentially" what the Big Three did. (The other six have not settled yet.) But there is considerable juggling of provisions. Many smaller firms are veering away from the carbuilders' agreements on annual improvement factors and pensions. Vacations are being altered. So are direct wage increases in some localities. (Increases in Detroit area shops average 2 cents below the Ford contract.)

• **Who's Up Next?** — The UAW holds an estimated 1500 contracts. At least 1000 are with firms that do some automotive work. Around two-thirds of the pacts expired in 1958 or will expire this year. Many contracts negotiated last summer were merely extended for a year or have wage reopeners scheduled in 1959.

If your firm is under the gun, you'll want to know what the 1958 settlements indicate. Ken Porter of the Employers Association of Detroit puts it this way: "There isn't any pattern." But some clauses and comments give you tips for bargaining strategy.

• **Play It Cool**—Because of economic conditions, the union won't press too hard during the first half. Locals are being given more discretion in bargaining. They'll be tough during negotiations, but they won't ask for the impossible if you prove you can't afford it. You'll probably want to arm your negotiating team with economic facts. The union will not insist on a demand that will undermine your finances.

SUB is an example. There has been little pressuring for it when a company doesn't have it. Those that do are sometimes able to win cost saving adjustments. For example, Clark Equipment Co.'s Buchanan, Mich., plant has tied severance pay to SUB. General Motors did the same thing last year, but where GM guarantees severance pay even if the SUB fund can't stand it, Clark employees get full severance pay only if the SUB fund is solvent. If not, employees are paid by installments as funds are rebuilt.

A Chicago partmaker revised its SUB setup to include a family formula similar to some state unemployment compensation provisions. The lowest rate is 65 per cent; it builds up in 2 per cent increments to a top of 73 per cent.

• **Pensions** — While carbuilders boosted pension rates (and shortened length of service), many smaller firms are holding them at present levels. Judging from reports, you should be able to keep your retirement age at 65 and the monthly pension formula around $2.45 times years of service.

Only 20 per cent of the UAW members aren't covered by pension plans; some firms have programs that aren't written into their labor contracts. Ordinarily, the union would press for negotiated plans, but now it looks like having any kind of plan makes you safe—for this year.

• **Vacations** — Smaller firms can probably realize some indirect savings here. Associated Industries of Cleveland reports prorating vacations is a trend in small companies. It works like this: If an employee worked six months and was laid off six months, he's only paid for half his normal vacation time.

If you like that idea, remember that the union will demand a clause to protect vacation pay for employees who work part of the year then get laid off at vacation time. Result: Aim for a clause that bases vacation pay on the number of months (or hours or weeks) the man works during the year in which his vacation falls.

• **Wages**—Cost of living will be a primary demand in 1959 when companies don't have it, believes Ray Vacha, AIC's industrial rela-

tions director. He says the union may concede a little on wage demands to get it.

Mr. Vacha's observation seems to hold true in the Ohio Valley and in the East, but some areas don't feel so strongly about it. Mr. Porter says it isn't a hot issue in Detroit. (In some respects, it's a convenience in figuring pay boosts.) But Mr. Porter claims managers in the Detroit area want no part of the annual improvement factor. The thinking is: There are plenty of firms which won't strongly object to giving a wage increase, but they hate to base it on the annual improvement factor because that's admitting it's tied to productivity. It's something the union will push hard enough without any help from management.

Strategy: Try to trade off cost of living clauses for a minimum wage boost. If you have cost of living, you may be able to talk your local out of the annual improvement factor.

• **Outlook**—Those are the main areas where UAW locals will listen to reasonable arguments and facts. Don't hope too hard for a three year contract. They seem to be on the way out for small firms and perhaps for bigger ones. Doehler-Jarvis Div., National Lead Co., Toledo, Ohio, has signed a UAW contract running to Apr. 1, 1962, and Calumet & Hecla's Wolverine Tube Div., Detroit, got a three year contract. But most companies are settling for a year to 18 months. If that's the best you can get, take it without reopeners. Often, a reopener clause on one item turns out to be carte blanche for renegotiating the entire contract.

Here are some other maneuvers:

1. Holidays—The union will press for an eighth paid one.

2. Grievances—If you push, you can get a reduction in the number of men serving on grievance committees and a cut in the number of hours spent in grievance processing.

3. Seniority—Look for a continuation of the drive to push seniority from company to plant, from plant to department, and from department to job classification. You should be able to hold your present position through 1959, but it may take some concessions in pensions and vacation policies.

Remember, the UAW will get tougher as business improves. You should be in a good bargaining position through the first half. After that, the United Steelworkers will have come to grips with the steel industry, and the UAW International will start pressuring locals for precedent setting contracts so it can collect bargaining ammo for 1961.

Copper Going Up?

The move in custom smelted copper last week may mean that primary is set to climb, too

CUSTOM smelted copper was increased 0.5 cent (to 29.5 cents a pound) on Jan. 12, the first movement in the red metal since Dec. 22.

• **Significance** — While sales have picked up some lately, they don't tell the whole story behind the price rise. Probably as important is the limited amount of custom copper available for sale. The situation has been brought about by the shortage of scrap offered for purchase and the reluctance of producers to bring in foreign origin concentrates when they can get a better price overseas.

• **Speculation?**—It looks like speculation in copper may be picking up. The Commodity Exchange has been more active lately, and prices on the London Metal Exchange have risen to the point where it's not economical to import metal.

• **More Rises?**—Those factors lead to the question: Are primary producers set to bump prices? Their sales are running near the high levels of last November. Add the market speculation and the rise in custom smelter quotations, and you come to this conclusion: An early hike seems likely.

Landis Buys Grinder Line

Landis Tool Co., Waynesboro, Pa., acquired the line of precision surface grinders previously manufactured by Abrasive Machine Tool Co., East Providence, R. I. Manufacturing and sales will be transferred to the Waynesboro plant.

Reynolds Now Rules British Aluminium

REYNOLDS METALS CO. and Britain's Tube Investments Ltd. have won out in a fight with Aluminum Co. of America to gain control of British Aluminium Co. Ltd., England's sole producer of primary aluminum.

• **Significance** — The move gives Reynolds a solid foothold in the European market and means a new outlet for the company's pig since BA's British smelters have a yearly capacity of only 140,000 tons. It also gives Reynolds a Canadian tie-in since a BA subsidiary, Canadian-British Aluminium Ltd., came on stream last year as Canada's second primary producer. Initial capacity is 45,000 tons; it will hit 180,000 in a few years.

• **Background**—In September, 1957, Reynolds and Tube Investments entered a 50-50 partnership to fabricate aluminum for sale in Britain by forming Reynolds-Ti Aluminium Ltd. Last November, Reynolds-Ti offered to buy all outstanding shares of BA.

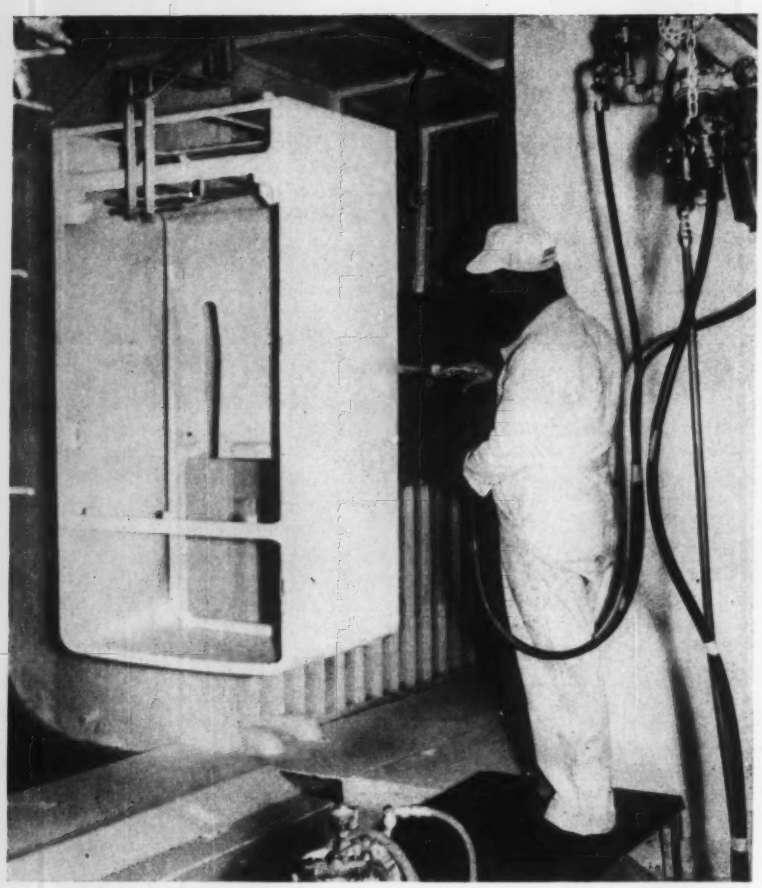
About the same time, Alcoa made a bid to buy 4.5 million of BA's unissued common shares, which would have given Alcoa one-third ownership.

Which offer would be accepted became somewhat of a cause celebre in the British press and charges of "Yankee domination" were hurled even from the floor of Parliament.

The British-Ti group now has captured 87.5 per cent of the voting stock, with Tube Investments owning 51 per cent and Reynolds 49 per cent. Since Reynolds-Ti now has control, Alcoa says it is "no longer interested" in buying up the unauthorized shares. The British Treasury still has to rule on the purchase before control becomes official—but approval seems certain.

Opens Research Center

Harbison - Walker Refractories Co., Pittsburgh, opened its Garber Research Center. The facility provides about 45,000 sq ft of floor space, houses laboratories for instrumental research and a pilot plant for applied research.



Gas refrigerators are making a comeback. Whirlpool Corp., St. Joseph, Mich., will market a new, re-engineered unit early in 1960.

Whirlpool Puts New Stress on Gas Appliances

NEW LIFE has been injected into the gas refrigerator industry by Whirlpool Corp., St. Joseph, Mich. Whirlpool is reversing the trend which plummeted gas refrigerator sales from 400,000 units in 1948 to practically nothing in 1957.

The company's first gas refrigerator appeared in May, 1958, after the firm acquired part of the facilities of Servel Inc., Evansville, Ind., long time producer of such appliances. Despite the recession year, the firm reports meeting its first year sales goal.

Manufacture of Servel's gas system was reactivated to compete with electric refrigerators and the cabinet was face-lifted to identify it with the Whirlpool line. For production economy, it was initially planned to assemble both gas and electric refrigerators in the same facilities and to put the gas absorption system in the same type cabinet as the company's electrical unit. But Whirlpool's research program to develop a competitive gas refrigerator advanced so rapidly, the idea was dropped.

• **New Gas Unit**—Now, it appears Whirlpool will market a new, re-engineered gas refrigerator early in 1960. The unit is visualized with a gas absorption system weighing only 90 lb (half as much as the present one). It will refrigerate 18 per cent more space. It doesn't have to be leveled precisely to operate. Its efficiency compares with that of electric refrigerator compressors. Costwise, the new appliance is competitive with electric units.

Modern techniques, and the fact the system has less than one-third as many welds as formerly, promise to simplify welding problems.

Elisha Gray II, Whirlpool Corp.'s chairman, points out that the 400,000 gas units sold in 1948 represented 8 per cent of the refrigerator market. In his opinion, a gas model competitive in all respects with electric types should sell at the ratio of 1 to 4.

Mr. Gray looks for more than a million units a year to be sold when the product and market are developed. But that may require five years.

• **No Major Problems**—Diversifying into gas refrigeration did not create many serious problems for Whirlpool. The company has been in the gas appliance business for many years, and introduced a gas clothes dryer in 1949. The biggest problem in producing the new refrigerator was to train welders (all those employed by Servel had long since departed).

Until 1955, Whirlpool was primarily a manufacturer of laundry appliances. Today, the RCA Whirlpool name covers a full line of major gas and electric appliances: Electric—Refrigerators, freezers, ice cube makers, vacuum cleaners, air conditioners (room and central), ranges (built-in and free-standing), automatic and wringer washers, dryers, washer-dryers, and portable and built-in dishwashers. Gas—Refrigerators, dryers, built-in and

free-standing ranges, and washer-dryers.

The company's electric appliance sales far exceed those of its gas units. Gas washer-dryer sales match those of electric counterparts, but electric dryers still follow the industry pattern of outselling those heated by gas. Electric refrigerator volume tops gas by a wide margin. Whirlpool is still increasingly optimistic about its progress in the gas industry and points to its improving penetration and volume in that field.

Progress thus far leads the firm to expect gas refrigerator sales in 1959, first full year in the industry, to increase 50 per cent.

• **Growth Cited**—John A. Hurley, vice president in charge of sales, observes that in 1947 the company had an annual volume of $24 million, about 500,000 sq ft of manufacturing space, and capital assets of $8.5 million. By 1957, gross sales were $402 million and indications are that 1958's will be about the same. Manufacturing space now totals about 8 million sq ft and capital assets are in the neighborhood of $218 million. Mr. Hurley continues: "While appliance sales may increase 7 to 9 per cent in 1959, Whirlpool sales will be up 15 to 20 per cent."

• **Develops Power Burner**—Whirlpool has also been developing a new principle in gas cooking called a power burner. First commercial application will be in a gas range to be introduced within 18 months. The company believes the development may revolutionize the gas range business.

The power burner mixes air and gas in such proportions for combustion that secondary air is not required. Combustion can take place in a covered space and at efficiencies earlier thought impossible. Perhaps the most appealing application of this principle is the gridless flush surface unit built into a kitchen countertop. All flames are hidden under a thin plate of Pyroceram, a ceramic glass which withstands high temperatures (it was originally developed for use in the nose cones of rockets). Some foods can be cooked, without pots or pans, directly on the ceramic glass cover plate.

Aid to Foreign Investors?

American metalworkers see exports shrinking as competitive imports set records. To hold world markets, they're setting up plants abroad, seeking tax breaks

IT'S A PRETTY GOOD BET that the U. S. House of Representatives will pass some sort of legislation to encourage American private investment abroad.

How fast that happens will depend on Democratic plans rather than the administration's leadership. How effective it will be depends on the enthusiasm Democrats and liberal Republicans can whip up in the Senate.

That's the report of Washington observers as U. S. industry makes plans to counteract the effects the European Common Market will have on American exports.

• **Democrats Plan**—It appears that the Democrats will offer a proposal to defer taxes on income from foreign investments. That would involve the establishment of foreign corporations by U. S. firms. No taxes would be collected until the income returned to the U. S.

Some U. S. metalworkers would prefer straight tax credit to the involved financial procedures necessary in setting up foreign corporations. But a split among administration leaders and the antipathy of Democrats to corporate tax reductions is stalling industry's hopes for quick action on that score (STEEL, Dec. 8, 1958, p. 72).

• **Conflict** — State Department officials told a House Ways & Means Subcommittee, headed by liberal tradist Hale Boggs (D., La.), that there is a genuine need to encourage private foreign investment. But the Treasury feels the huge deficit facing the country in fiscal 1959 should get top priority.

For metalworkers wanting to invest abroad, it means chances for some kind of aid are good, but it may be weaker than desired.

• **Big Shift**—A growing number of U. S. metalworking firms are reported to be swinging toward foreign investments and away from exports (STEEL, Dec. 22, 1958, p. 44).

Another spur to investing abroad is the European Common Market. The six-nation trade combine will reduce tariffs between its members and eventually raise tariffs to nonmembers. That is expected to drastically reduce U. S. metalworking's sales to those markets. But U. S. firms with subsidiaries or affiliates inside the Common Market will get the same protection as home-owned firms.

Tax problems comprise one of the major blocks to U. S. private foreign investment. Political instability is another. American manufacturers are asking the U. S. government to help overcome those problems.

• **Eight-Point Plan** — A sweeping proposal to stimulate private investment abroad was suggested to the House Subcommittee on Foreign Trade Policy by M. J. Epley Jr., vice president, The Texas Co. He urged:

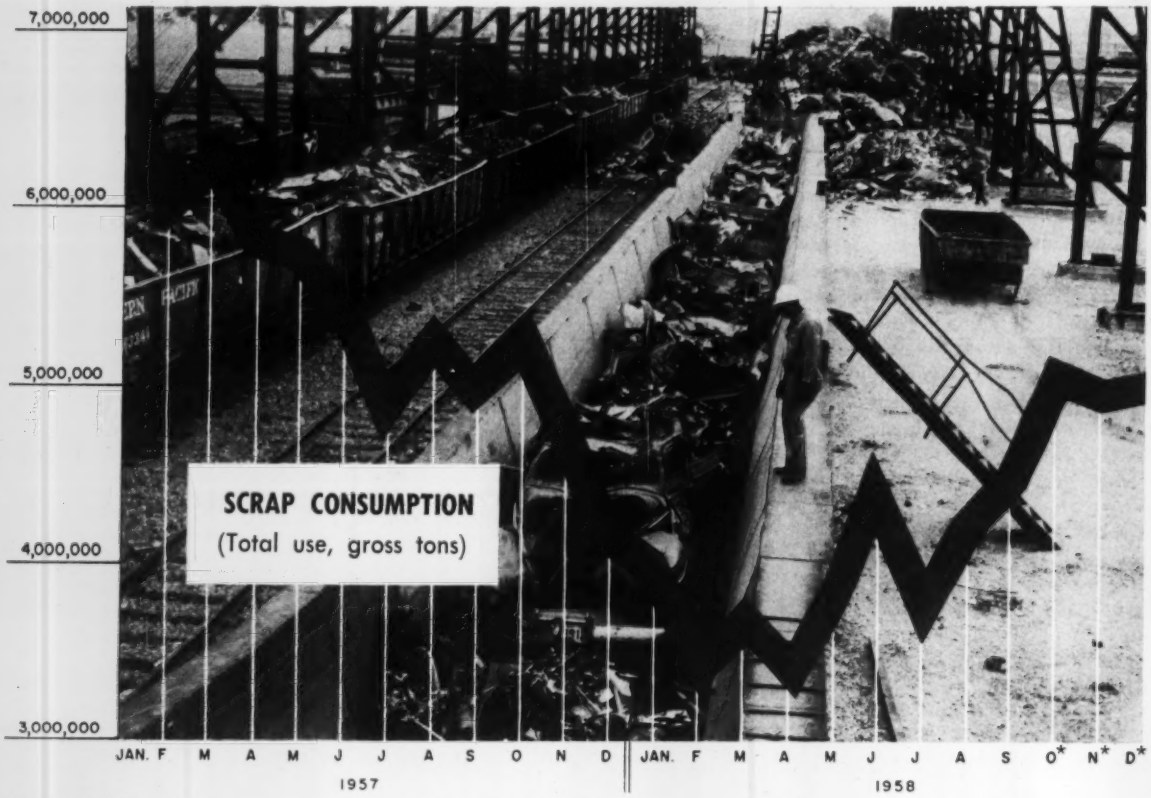
1. Government loans to foreign countries for roads, irrigation, sanitation, education, health, postal facilities, and other basic services on which private enterprise depends.

2. Government representatives should help foreign nations remove the deterrents to American private investment.

3. Stronger commercial treaties to help "stabilize and broaden the assurance of fair treatment to U. S. investors." They would outlaw discriminatory taxation and punitive labor laws.

4. Changing U. S. tax laws to permit U. S. tax credit for taxes waived by foreign governments, removal of the "per country" limitation on foreign tax credits, deferment of tax payments of foreign earnings until after they are distributed to U. S. parent companies, and other modifications.

5. Government aiding foreign nations to better understand "the climate in which American private industry can operate most effectively."



*Estimated by STEEL.
(Bureau of Mines data.)

Research Can Save Scrap Industry

DEALER SCRAP is at an economic crossroads. Markets are depressed because of such technological advances in steel as low grade ore beneficiation and oxygen melting. Scrapmen must act quickly to escape marginal or standby status in the national economy.

Speakers gave that warning to the Institute of Scrap Iron & Steel Inc. at New York, last week.

• **A Poor Year**—You have to go back to 1946 to find a worse year than 1958 was for purchased (open market) scrap. Some scrapmen call it the worst since 1932. Only 22 million gross tons were consumed domestically — in addition to 28 million tons of home scrap generated by steel mills and foundries. In 1957, purchased scrap consumption amounted to 29.6 million tons.

Exports, on which the dealers had banked for market support, fell sharply, to 2.6 million tons, against 1957's record of 5.9 million tons.

Prices skidded last year. STEEL's composite on No. 1 heavy melting steel (Pittsburgh, Chicago, and Philadelphia) averaged just under $38, vs. about $47 in 1957 and $54 in 1956, the record year for prices.

• **Outlook Better**—This year holds promise of improvement, but demand is not keeping as close to the pickup in steel operations as scrapmen would like.

Myron L. Chase, institute president, warned dealers: If the industry is to survive and prosper, it must launch a hard-core economic and technical research program aimed at stabilizing quality of output and market demand. He urged that a research director conduct a complete scientific and technological evaluation of scrap consistency, content, and end uses by the steel industry.

"We can only hope to recapture our market position by employing the kind of program used by the steel industry to develop the quality and dependability of other raw materials," he said.

• **Sees Steady Demand**—Discussing steel's technological advances, William L. Swager, Battelle Memorial Institute, was confident the ever changing technologies of iron, steel, and scrap will result in a higher, steadier demand for scrap in a narrower price range.

"Changes in steel technology will increase flexibility of plant operations. A plant will be able to adjust more quickly to changes in raw material, availability and prices, as well as changes in demand for steel," he said.

He warned that increasing demands of steel customers for improved and new products would continue the trend in demand from the mills for higher quality scrap.

Optical Equipment Can Serve You

As a Supplier . . .

New products automate:

- Inspection
- Quality Control
- Metallurgical Testing
- Microscopic Examination
- Tool Setups
- Toolmaking
- Part Alignment
- Gaging
- Research
- Material Handling

As a Customer . . .

The industry buys:

- Cast Iron
- Carbon Steel
- Stainless Steel
- Aluminum
- Brass and Bronze
- Diecastings
- Motors
- Fabricated Metal Parts
- Machine Tools
- Metal Files

American Optical Co.

Optical Goods Ride Uptrend

Makers predict steady progress. Two-pronged benefit to metalworking: 1. More and better equipment to step up output, cut costs. 2. A growing market for your products

OPTICAL EQUIPMENT makers foresee the rush of industrial technology lifting their sales to new heights in the coming decade. One reason: The growing complexity of our defense efforts which require precision instruments for missile and aircraft guidance systems, automatic fire control and range finding components, tracking and measuring devices, distant early warning systems.

• **Metalworking's Role**—The trend toward higher output, miniaturization, closer tolerances, and greater quality control will make metalworking an increasingly important market for optical equipment. Farrand Optical Co. Inc., New York, states: "Optical tooling techniques are rapidly replacing mechanical methods in alignment tasks. They are far more accurate and much easier to use. Fabrication is speeded and simplified, saving time, labor, and product costs."

Adds Bausch & Lomb Optical Co., Rochester, N. Y.: "The demand by metalworkers for closer tolerances which can be met only by optics is expected to bring a steady growth in optical goods sales."

What kinds of optical equipment does metalworking buy? These seem most important: Contour projectors, bench comparators, metallographs, refractometers, microscopes, optical gages, alignment interferometers, precision diffraction gratings, spectrographs, radiation shielding glass, photomicrography, and microprojection equipment, viscosimeters, magnifiers.

• **Two Way Street**—Metalworking's stake in the optical industry isn't limited to the role of a buyer. Optics manufacturers are customers (see above) for ferrous and nonferrous products, components such as castings, stampings, and fasteners, and all types of machine tools. As the industry grows, it will assume greater significance as a customer for your products.

• **What Optics Do**—Optical equipment has many applications in research, production, inspection, and quality control problems.

Eastman Kodak Co., Rochester, N. Y., says that optical gaging with contour projectors enables an operator to quickly determine if a part meets prescribed tolerance standards. Direct measurements can be made with accuracies on the order of 0.0001 in. Continues Eastman: "It is entirely feasible to inspect such items as the internal contours of

400 lb breech blocks, the odd profiles of a plowshare blade, or the eccentricity of a 36 in. propeller shaft." Comments Optical Gaging Products Inc., Rochester: "Optical gaging is the only method of inspection applicable to certain types of production line inspection problems. It satisfies the need for information on the whole contour or outline of a part."

Radiation shielding windows like those manufactured by Corning Glass Works, Corning, N. Y., allow safe viewing and remote control handling in hot labs of nuclear testing stations and powerplants. A remote viewer, made by American Optical Co., Buffalo, protects operating personnel during production of titanium and zirconium in consumable electrode arc furnaces.

Toolmaker microscopes simplify the measurement of complex setups that otherwise must be done by roundabout methods.

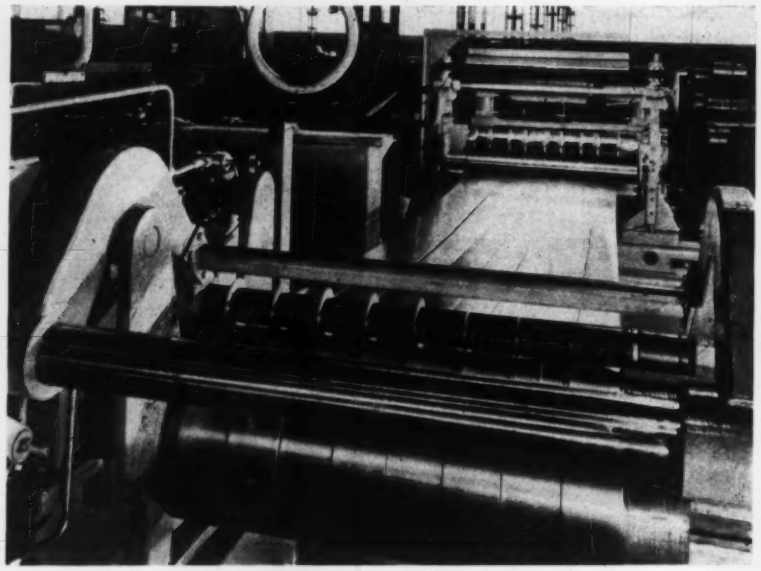
• **Coming Up**—Watch for new developments in optical goods that may spell greater savings in your production and inspection operations. Especially significant could be new optical gages, optical gratings, and profile projects.

• **How Big?**—Around two dozen firms had instrument and lens sales close to $55.1 million in 1947; $121.8 million in 1954; and $158.3 million in 1957.

Running counter to the general trend, optical equipment makers saw a slight rise in 1958. Business hit about $166 million. This year, manufacturers predict sales gains of 5 to 12 per cent above 1958 to about $186 million.

Many makers believe the next few years will bring annual sales gains of 15 per cent. The greatest potential is in microscopes, says Bausch & Lomb and American Optical. Zoomar Inc., Glen Cove, N. Y., expects increased business for industrial TV, specialized optics for guided missile tracking, and in electronics equipment. Fish-Shurman Corp., New Rochelle, N. Y., finds defense uses growing.

• **Trend To Watch**—Increasing imports of optical goods (mainly from Germany, Japan, and Italy) is a serious problem, says Ilex Optical Co., Rochester.



Coil slitters in the Detroit warehouse of Jones & Laughlin Steel Warehouse Div. can handle coils up to 48 in. wide. The gage is checked electronically

J&L Shows Detroit Center

JONES & LAUGHLIN Steel Corp.'s Warehouse Div. staged an open house at its new, electronically equipped warehouse at Detroit last week. It covers 142,000 sq ft.

Electronic devices insure that orders meet customer specifications. Included is the Sperry Ultrasonic Reflectoscope which can penetrate many feet of steel to detect flaws.

J&L's Xact-O-Mike slit coils are made possible by x-rays which record variations as small as 0.0001 in. Part duplication is made possible by electric eye tracing devices on multiple torch, flame cutting machines.

The $1 million facility is one of 13 J&L warehouses in the country. C. J. Pistor is manager.

George L. Stewart, president, Warehouse Div., predicted sales from steel warehouses (off 25 per cent last year) will be up 8 to 10 per cent in 1959's first quarter. He said demand for steel and other products is increasing and a modest rebuilding of stocks is in progress.

Electromet Unit Renamed

Union Carbide Corp., New York, changed the name of its Electro Metallurgical Co. to Union Carbide Metals Co. The parent firm also announces that a contract for construction of an ore dressing plant at Newport News, Va., has been awarded by Union Carbide Ore Co. to Tidewater Construction Corp., Norfolk, Va. The new plant will process manganese ore from affiliated mining operations in British Guiana. Capacity will be about 30,000 tons of ore a month.

NEW OFFICES

Eastern Stainless Steel Corp., Baltimore, opened a sales office at Wichita, Kans. John A. Goode is in charge.

Allegheny Ludlum Steel Corp., Pittsburgh, will take more space in the Oliver Building to accommodate personnel now in other buildings in Pittsburgh and Brackenridge.

R. O. Hull Inc., Rocky River, Ohio, opened a sales office, service laboratory, and warehouse facilities at Ferndale, Mich.

Cummins Diesel International Ltd., a newly formed subsidiary of

Cummins Engine Co. Inc., Columbus, Ind., opened offices in Nassau, Bahama Islands. Offices will soon be opened in Europe and South America.

NEW ADDRESSES

Bethlehem Steel Co.'s executive and administrative staffs in Buffalo are moving from their plant to a new, multimillion - dollar office building on Buffalo's Lake Shore Road.

Jones & Laughlin Steel Corp. has moved its Youngstown sales office to 903 Union National Bank Bldg., that city. No changes in sales personnel have been made.

CONSOLIDATIONS

Stran-Steel Corp., Detroit, acquired **Metallic Building Co.**, Houston. No personnel changes are contemplated.

H. K. Porter Company Inc., Pittsburgh, acquired **Thermoid Co.**, Trenton, N. J. It will now be known as the Thermoid Div.

Chisholm-Ryder Co. Inc., Niagara Falls, N. Y., has acquired **K. R. Wilson Inc.**, Arcade, N. Y. The transaction involved about $500,000.

Eaton Mfg. Co., Cleveland, will acquire **Cleveland Worm & Gear Co.**, and its subsidiary, **Farval Corp.**, both of Cleveland. The transactions are subject to shareholders' approval.

Royal Industries Inc., Los Angeles, and its subsidiary, **Royal Jet**, are negotiating a merger with **Vard Inc.**, Pasadena, Calif., and **Ideal-Aerosmith Inc.**, Hawthorne, Calif. M. L. Bengtson will be president of the combined companies.

Combustion Engineering Inc., New York, will acquire **General Nuclear Corp.**, New York, through an exchange of stock.

Heil Co., Milwaukee, acquired **Truck Engineering Corp.**, Cleveland. Julius L. Glick, president of Truck Engineering, will continue as general manager of the new Heil subsidiary.

Chester Products Co., Hamilton, Ohio, a division of **Ransohoff Inc.** merged with **Fabricated Steel**, Hamilton, Ohio, to form Chester Products Inc.

Vulcan Materials Co., Birmingham, acquired **Gary Slag Corp.**, Gary, Ind.

NEW PLANTS

Industrial Research & Development Corp., Chattanooga, Tenn., is constructing a building to house research and development facilities.

Split Ballbearing Div., Lebanon, N. H., Miniature Precision Bearings Inc., opened a new plant for the manufacture of ball bearings.

Servo Corp. of America, New Hyde Park, N. Y., will erect a facility to house research and development, manufacturing, and administrative activities of the firm's six plants.

Radio Corp. of America, New York, has leased a facility at Croydon, Pa., for the manufacture of electronic products.

Blaw-Knox Co., Pittsburgh, is constructing a plant for its Power Piping & Sprinkler Div. at Jackson, Miss.

Tempel Mfg. Co., Chicago, will construct a $10 million facility to house administrative, engineering, research, and manufacturing activities.

Byron Steel Processing Inc. opened its Blue Island, Ill., plant for stocking and handling plates, sheets, bars, and structurals. Services will include shearing, pickling and oiling, flame cutting, and storage.

Canadian Wilbur B. Driver Co. Ltd., Toronto, Ont., has started construction on a plant that will manufacture precision alloys for the electronic, electrical, chemical, and mechanical industries.

Big M. Metal Products Co., Batesville, Miss., will erect a foundry for the manufacture of outdoor furniture and other metal products.

Industrial Engine Service, Youngstown, will build a facility for the reconditioning, repair, and stocking of parts for industrial engines.

ASSOCIATIONS

Leonard Raymond, chief automotive engineer, Socony Mobil Oil Co., New York, was elected president, **Society of Automotive Engineers**, New York.

Paul D. Germond, Revolvator Co., North Bergen, N. J., was elected president of **Association of Lift Truck & Portable Elevator Manufacturers.**

H. Morrogh has been appointed director of the **British Cast Iron Research Association** following the retirement of Dr. J. G. Pearce, director from 1924 through 1958.

Robert R. Miller, president, Precision Metalsmiths Inc., Cleveland, was elected president of the **Investment Casting Institute.**

R. A. Brackett, executive vice president, Spencer Turbine Co., West Hartford, Conn., was elected second vice president of the **Foundry Equipment Manufacturers Association Inc.**

Eugene Caldwell, general manager, Baker Industrial Trucks, a division of Otis Elevator Co., New York, was elected president of **Material Handling Institute Inc.**

Howard B. Johnson, president, Atlantic Steel Co., Atlanta, was appointed director of the **American Iron & Steel Institute.**

James R. Bright, associate professor of business administration, Harvard University, was elected chairman of **College-Industry Committee on Material Handling Education.**

Ike Moves Farther Right

THERE CAN BE no backing down now for President Eisenhower's administration. In his State of the Union message ten days ago and his budget message today, Ike firmly committed the last two years of his administration to a policy of conservatism—not quite so far to the right as some conservatives would push him but at least far enough from the left to alienate most liberal Republicans.

Sen. Hugh Scott's (R., Pa.) plan to ask for depressed area legislation indicates the distance between the liberals and Ike. Senator Scott was one of the few Republicans to win in last November's Republican debacle. Ike also failed to back the liberals in their fight last week with Sen. Lyndon Johnson (D., Tex.) to kill the filibuster.

Through Vice President Nixon, the administration has announced its belief that the U. S. is equal to or ahead of the Russians in missile and space technology. With leading rocketeers saying the Reds will beat us to the moon, this attitude will become increasingly difficult for Ike to live with. His proposal for a defense budget for fiscal 1960 of just $100 million more than we will spend in fiscal 1959 indicates his determination. The national budget of $77 billion for fiscal 1960 ties in closely with his announcement that he will seek legislation to amend the Employment Act "to make it clear that the government intends to use all appropriate means to protect the buying power of the dollar."

He thinks a balanced budget remains this nation's best weapon against inflation.

Small Business Committee Recommends

The House Small Business Committee will continue its interest in the aluminum and aircraft industries this session. It recommends that small, nonintegrated fabricators and processors of aluminum consider forming "a buying corporation" to obtain long-term, guaranteed contracts for buying metal from the primary producers.

Because increasing emphasis is on research and development of new weapons (and the large corporations get most such contracts), the committee wants the Armed Services Act amended to provide for "the negotiation of procurement contracts wherever necessary to insure" small business a fair proportion of defensework. A similar bill was passed in the 84th Congress by the House but not considered by the Senate.

Evaluate Cost of New Atom Program

A seven-year program for the development of atomic energy (recommended last year by the Joint Atomic Energy Committee) will cost $250 million to $275 million a year, reports the Atomic Energy Commission's Advisory Committee (made up of industry, university, and government representatives).

The Congressional committee's recommendations are viewed by most observers as what the liberal, Democratic Congress will follow this season.

Half the money will go for reactor R&D, the other half for construction of reactors. Capacity for 1 million kw of electricity would result. From $150 million to $200 million would come from Uncle Sam. Industry would provide the rest, principally for prototype plants. Present AEC spending for comparable programs cost about $190 million this fiscal year.

Depreciation Reform Stalled?

Ways & Means Committee spokesmen say they have no orders from Chairman Wilbur Mills (D., Ark.) to prepare for any special effort on depreciation this year. Basic to the chairman's thinking is the need for revenue, they report. The state of the nation's economy will have a lot to do with how fast the committee plans to act. Present plans call for the committee to take up life insurance tax problems first. Renegotiation (the act expires June 30) will have to be considered by March to give the Senate Finance Committee time to act. After that will come extension of corporate and excise taxes and consideration of Ike's request for higher gasoline taxes to keep the road program going.

The only way for quick action on depreciation seems to be a move by the Treasury Department on Bulletin F. It's possible that Treasury could ask Congress to do the job, rather than revising depreciation rates itself through executive action.

Incidentally, Sen. Everett Dirksen (R., Ill.) minority leader, predicts no "broad or sweeping tax change" this year except for "some modifications in the excise field."

Capitol Notes

Sources close to Minnesota rate Sen. Hubert Humphrey's (D., Minn.) interest in controlling iron ore imports as half-hearted. Tariff Commission is conducting a study of imports for the Senate Finance Committee.

An announcement of interest to manufacturers of steel parts

Improvements in today's STRESSPROOF STEEL BARS WITH COPPER

1 **100,000 PSI YIELD STRENGTH** in all sizes . . . without heat treating.

2 **IMPROVED PHYSICAL PROPERTIES...** better fatigue life wearability, and resistance to atmospheric corrosion. Over-all quality is improved.

3 **IMPROVED MACHINABILITY...** STRESSPROOF with copper now machines faster and better than ever. It gives longer tool life, better finish, and more production from a day's run, according to shop production records.

4 **CLOSER TOLERANCES...** Tolerances for rounds have been tightened to meet the need for more precise parts as follows:

¼" to 1½"	Over 1½" to 2½"	Over 2½" to 3⅜"
+.000 −.004	+.000 −.005	+.000 −.006

5 **COMPARED WITH OTHER STEELS, STRESSPROOF COSTS EVEN LESS TODAY...** Also saves machining and heat treat costs, and you get a better quality part. It will pay you to take another look at this improved material.

Your STEEL SERVICE CENTER stocks contain today's STRESSPROOF. It has been produced and shipped over a several months' period.

JUST PUBLISHED! Use this coupon to request your copy of new bulletin, "Improvements in Today's STRESSPROOF Steel Bars."

La Salle STEEL COMPANY
1414 150th Street, Hammond, Indiana

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Eagle Music Wire

—for Dependable Springs—

Our Phosphate Coated Music Wire

. . . especially merits your careful investigation if you are interested in superior uniformity of PHYSICALS. This wire amazes the Spring Manufacturer when he tries it on his most difficult jobs. *A trial order will convince you.*

WASHBURN WIRE COMPANY, NEW YORK CITY

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109

CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

How Population Estimates Have Changed

(Millions of people)

Year	Estimate Made in 1958	Estimate Made in 1955	Estimate Made in 1953
1960	180.1	177.8	177.4
1965	195.7	190.3	189.9
1970	213.8	204.6	202.4
1975	235.2	221.5	213.6

Bureau of the Census, Second series.

'75 Population To Overshoot Estimate by 21.6 Million

METALWORKING MANAGERS take note: The country's population boom is accelerating. The Bureau of the Census now expects a population of 235.2 million by 1975. That's 13.7 million above the estimate made in 1955 and 21.6 million above the one made in 1953.

The bureau's calculations were adjusted to update the bench mark and to allow for expected changes in fertility, mortality, and net immigration. Such long range prognostications are subject to error, but the consistent upturn in projections the last few years is a factor for metalworkers to consider.

• **Expansion Foreseen** — Despite slack business in 1958, many firms continued expansion plans and research and development programs to prepare for what is hoped to be the soaring sixties. Population alone does not guarantee increased production, but it is a basic factor in market planning. This country has historically kept production in pace with or ahead of population. In view of the new census assumptions, present plans and marketing facilities may not be sufficient.

Metalworking's sales prospect for 1975 is $372 billion, vs. $135 billion this year. Per capita consumption of metalworking goods has increased $41 a year (constant dollars) since World War II.

• **Capacity To Double**—If steelmakers keep up with the projected population increase, they'll require 250 million tons of capacity in 1975, 140 million tons over the 1959 level, or a yearly increase of 8.7 million tons for the next 16 years. Even though many men in industry feel that the estimate is high, they recognize the need for adjustments in market planning.

Census takers will start the tedious job of counting noses next year. The new figure is expected to be 180.1 million, 3.3 million more than this year, 29.4 million more than the 1950 figure.

Yoder Bucks Slump

Expands and replaces equipment; continues R&D and advertising. Result: It's ready for '60s

EVEN A YEAR like 1958 didn't slow down Yoder Co., Cleveland. It has kept its four point program of facility expansion, equipment replacement, research and development, and advertising in high gear.

"Cutbacks will retard progress, no matter how bad business is," declares Douglas O. Yoder, president. "A company never stands still. It goes up or down."

When the soaring sixties come, this roll forming and pipe and tube mill manufacturer will be ready.

• **The Plan**—Preparations include:

Physical expansion: Hemmed in at its present city location, the firm purchased sufficient acreage in suburban Westlake a few years ago to permit expansion. Slack times did not slow this project. The roll and welding departments occupied 39,000 sq ft at the new site last February. Result: More room for assembly at the old plant.

Equipment replacement: The regular equipment replacement cycle, based on a percentage of the firm's budget, was maintained. "You can't sell capital goods if you don't buy them yourself," comments Mr. Yoder. But most important, modern equipment will be ready to turn out Yoder products in the next decade.

R&D: The company believes research and development is important to the continuing growth of a progressive company. As a result, the budget has been expanded. Maintaining high quality and refining present products constitutes the prime goal of this phase of the program. New adaptations of Yoder-products are weighted heavily.

Advertising: More promotion is needed to keep sales up when business is poor. Advertising was not cut.

• **Results**—The payoff has started. While expenditures for capital goods were down more than 28 per cent in 1958, Yoder sales were down only 15 per cent. The backlog that has been built up has put this manufacturer in good position to take advantage of the coming upturn.

CIMCOOL ANNOUNCES...

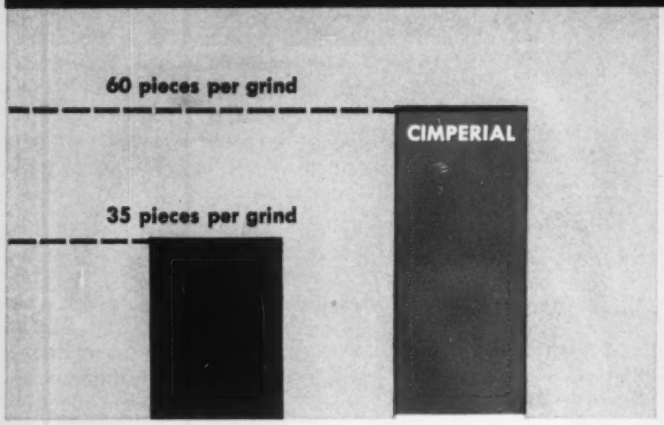
CIMPERIAL

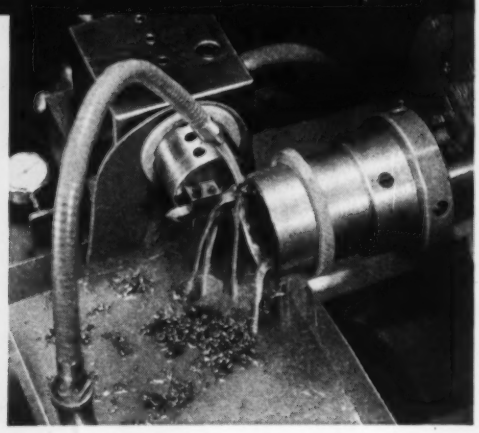
A Crowning Achievement in Cutting Fluids!

Now—Cincinnati Milling Products Division presents the most advanced cutting fluid in the history of the industry—CIMPERIAL, crowning achievement of the great line of CIMCOOL° products!

Since shortly after World War II, the Cincinnati Milling Products Division has conducted continuous and exhaustive research into Cutting Fluid action. This intensive study led to the introduction of radically different CIMCOOL, and then nationally acclaimed CIMCOOL S2. And now—CIMPERIAL!

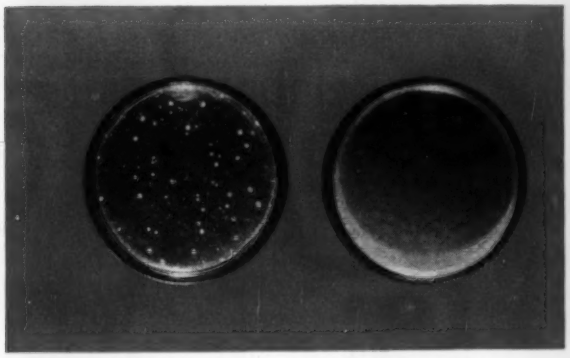
CIMPERIAL IS THE NEW SOLUTION FOR METAL CUTTING PROBLEMS!



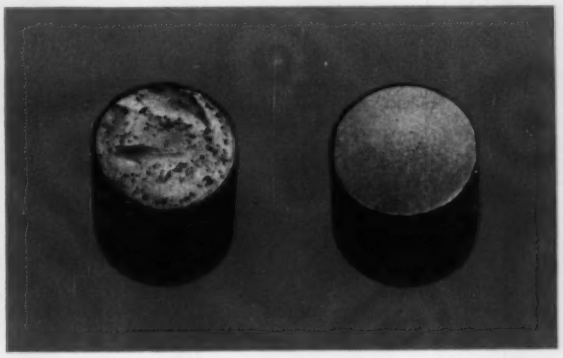


CIMPERIAL, a chemical solution, *defeats heat* and *increases tool life*. CIMPERIAL's new extreme pressure (EP) additives, which it contains in abundance, withstand high temperatures and pressures. By lowering friction, one source of heat is reduced. CIMPERIAL also decreases the larger source of heat, metal deformation. Through the elimination of both sources of heat to a remarkable degree, CIMPERIAL greatly increases effective tool life, and permits *faster speeds and feeds*. For example, in the plant of a diesel engine maker, CIMPERIAL boosted the average pieces per tool grind from 35 to 60 (a 70% increase) on a special lathe turning cast iron pistons complete.

CIMPERIAL, in a series of exhaustive tests, obtained more efficient metal cutting action with less force on the tool than either a soluble oil or a cutting oil. The threading operation pictured here shows the set-up of one of the many tests made. CIMPERIAL obtained a better finish, visible proof of the effectiveness of CIMPERIAL's newly discovered EP additives.

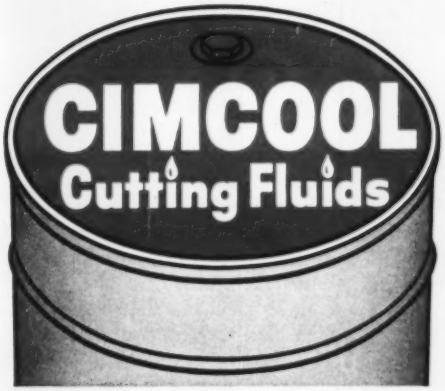


CIMPERIAL has a maximum amount of effective bactericides. It contains no food for bacteria . . . will *not* turn rancid! On the left in the illustration, note the white specks. These are bacterial colonies grown in three days from a measured quantity of ordinary tap water. On the right, the same tap water was used to dilute CIMPERIAL. After three days, no bacterial growth has occurred, due to the effective bactericides in CIMPERIAL.



CIMPERIAL offers positive rust control unequalled by any other water miscible cutting fluid. This rust control is obtained by incorporating two types of chemical rust inhibitors which work independently to counteract corrosion on all metals. Mixtures of CIMPERIAL and a soluble oil, each at 1:40, were left overnight on the polished steel cylinders shown above. CIMPERIAL shows no rust; the soluble oil sample shows light rust overall, with one area of intensive rusting.

YOU, TOO, can lower tool costs and increase your production with new, revolutionary CIMPERIAL! In CIMPERIAL, the Cincinnati Milling Products Division has developed the most advanced and completely effective cutting fluid in the metal-working industry. It is an entirely *new* chemical concentrate *especially designed for heavy-duty applications.* CIMPERIAL is the only water-soluble fluid capable of performing the tough, low-clearance, low speed operations previously limited to cutting oils. CIMPERIAL also provides excellent cutting action on standard operations. CIMPERIAL is a *chemical solution*—not an emulsion—which effectively covers *95% of all metal cutting jobs.*



FOR 100% OF ALL METAL CUTTING JOBS

Production-proved products of The Cincinnati Milling Machine Co.

CIMPERIAL—*newest* in the world-famed, industry-proven line of **CIMCOOL Cutting Fluids! CIMCOOL 52 Concentrate**—Covers 85% of all metal cutting jobs. **CIMPLUS**—The transparent grinding fluid with exceptional rust control. **CIMCUT Concentrates (AA, NC, SS)**—For jobs requiring oil-base cutting fluids. **CIMCOOL Tapping Compound —CIMCOOL Bactericide—CIMCOOL Machine Cleaner.**

For full information on great new CIMPERIAL and the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor today. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

* Trade Mark Reg. U. S. Pat. Off.

Manager—Submanager Salary Relationships

Manager's Salary	Salary of Highest Submanager	Salary of Lowest Submanager
Under $10,000	85%	60%
$10,000 to $15,000	80%	50%
$15,000 to $20,000	75%	40%
Over $20,000	70%	30%

Source: Survey by Thompson Products Div. Thompson Ramo Wooldridge Inc.

Here's How To Build Salary Rates

RECESSION hits many managers where it hurts most—in their own pocketbooks. When large bonuses and incentive earnings evaporate, they discover their base pay is not commensurate with job responsibilities.

• **Problems for Management** — Some metalworkers make across-the-board management salary cuts. These magnify internal inequities and salaries which are already out of line with area and industry averages. Moratoriums on merit salary increases and overemphasis on length of service for salary adjustments increase turnover among the more talented and younger managers.

Poor salary administration causes these problems. The growing mobility of managers and the increasing competition for those with the most talent signal a need for increased emphasis on effective salary administration.

STEEL will explore three facets of salary administration. This article deals with the development of a sound salary structure. Next week, we'll discuss performance measurement of the individual as it concerns salary adjustments. The third article will present approaches to supplemental compensation for managers.

• **Building a Program**—There are two keystones to effective salary programs, says Roy A. Dingman, vice president-industrial relations, A. O. Smith Corp., Milwaukee. These are: 1. Your firm's philosophy or goals of salary administration. 2. An acceptable method for slotting positions into their proper relationship.

The market place, salary administrators agree, provides the only practical yardstick for measuring salaries. As Bell & Howell Co., Chicago, declares in its wage policy: "It is the policy of B&H to maintain wage rates at the highest practical level, consistent with rates paid for comparable work in its area and industry, taking into account general economic and business conditions and the firm's competitive situation." But the market place is only a guidepost because accurate measurements can be obtained only at the low levels (first level supervision, draftsmen, and bookkeepers), and top positions (presidents and other principal corporate officials).

Difficulty in making accurate comparisons in the middle management ranks stems from two problems: 1. Jobs in different firms may have identical titles but widely varying duties and responsibilities. 2. There is a great variance in salaries paid for supposedly equal jobs.

• **How To Begin**—Most formal salary structures have been built by using a point or factor comparison plan. In these, each position is analyzed according to the required technical expertness, practical skill, problem-solving ability, and accountability (including freedom to act, job impact on end results, and magnitude of the end result).

These broad areas are broken down into key factors and weighted according to importance. Each factor is divided into degrees of importance to the specific job. These degrees, to which point values are assigned, are spelled out in detail. Points for each factor are assigned according to the degree which best fits the job content.

The exhibit on Page 43 shows factors and degree points used by A. O. Smith Corp. in an analysis of about 1450 positions.

• **Management Must Lead** — Success in building a sound salary structure depends upon the atmosphere in which it's begun, experts warn. Top management must initiate the program. Individuals experienced in job evaluation (consultants are an excellent source) must administer it. Employees must feel that the evaluations are objective and factual. At A. O. Smith, the individual participates by writing his own job description. He and his superior agree on the description before the evaluation is made.

For maximum objectivity, it's best if the appraising team doesn't know existing salary levels. Evaluations should be based on the position's normal assignments.

Relating properly slotted positions to specific salary levels is something less than scientific, experts agree. Salary comparisons can be obtained in area surveys, checks in your own industry, and industry associations. The American Management Association provides one of the best survey services.

R. A. Bosshart, consultant with Edwin Shields Hewitt & Associates, suggests starting at both ends of the salary structure and working toward the middle because salary comparisons are most accurate at these levels. Then, by applying carefully selected bench marks in the middle management ranks to comparable positions in your structure, you can develop a reasonably accurate salary schedule.

• **Team Plan**—Some firms are exploring the team concept developed by Thompson Products Div., Thompson Ramo Wooldridge Inc., for relating salaries to contribution to the over-all operation. "We've found in our surveys that definite pattern relationships exist between a team head and his subordinates," relates Robert Howe, staff director of salary and organization.

The head of a group is automatically high man on the salary schedule. The man whose contribution is least necessary to carry out the team's function is low man.

In a study of 20 companies reporting management salaries for 55 autonomous product line divisions, Thompson found that at every salary level there was a typical percentage relationship between the high and low team members. "The percentage relationships vary inversely as the salary level of the division managers changes," Mr. Howe emphasizes.

"For example: A manager of a $50 million sales division is likely to have a base salary of $31,000. The highest man under him might earn $20,000, the lowest, $11,000. In a $10 million sales division, the manager might earn $22,000. The highest subordinate would earn about $16,000, the lowest about $10,000." (See exhibit on Page 42 for rough percentage relationships by salary levels.)

Key Factors in Job Evaluation

Every manager's job requires most of the factors listed below. The scope of each factor involved in a position is reflected in the points.

For example: The lowest level job in a department involves routine and simple, repetitive operations requiring little personal judgment. Score 70 points.

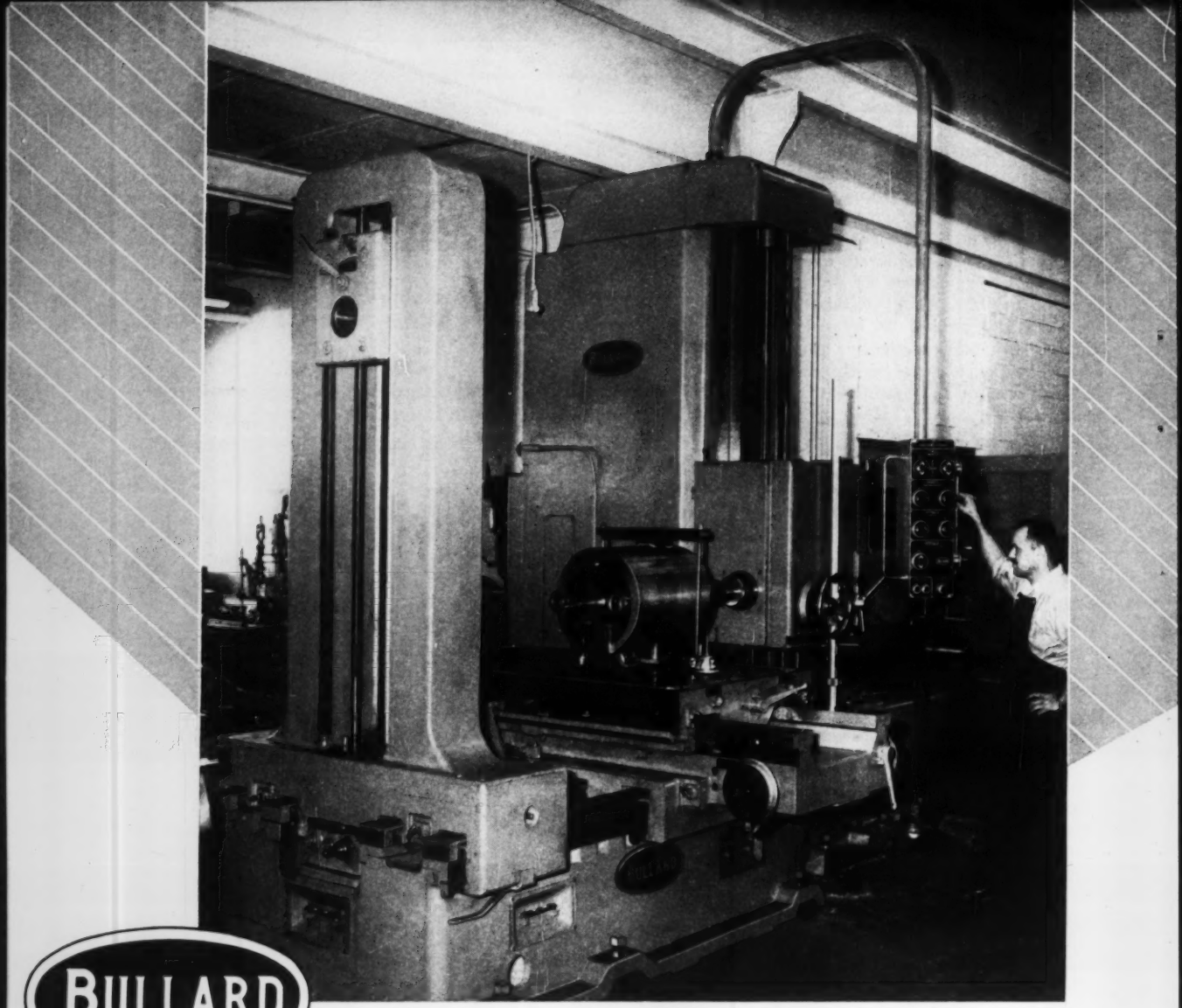
The department head's job involves a wide variety of complex duties requiring a complete knowledge of company policies and major decisions and judgment. Score 280 points.

Tabulate the points, and you can figure where a man should stand on the salary scale.

	Point Values by Degrees of Importance			
	1.	2.	3.	4.
1. KNOWHOW				
education	20	40	60	80
job knowledge	70	140	210	280
2. MENTAL REQUIREMENTS				
analyzing	10	20	30	40
devising, planning	20	40	60	80
initiating	30	60	90	120
3. ACCOUNTABILITY				
programs, operation	30	60	90	120
profit or loss	30	60	90	120
safety	5	10	15	20
employee relations	15	30	45	60
training	10	20	30	40
public relations	10	20	30	40

Building a salary structure and assigning salary levels is only the first step in effective salary administration. Salaries and job content change, individuals deserve merit pay increases, and our rapidly advancing technology is forcing new emphasis on providing engineers parallel progression opportunities in technical as well as administrative careers. We will present approaches to these next week.

This is the first of three articles on techniques for setting salaries of metalworking managers. Subsequent articles will appear Jan. 26 and Feb. 2. An extra copy of this article will be available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



BULLARD

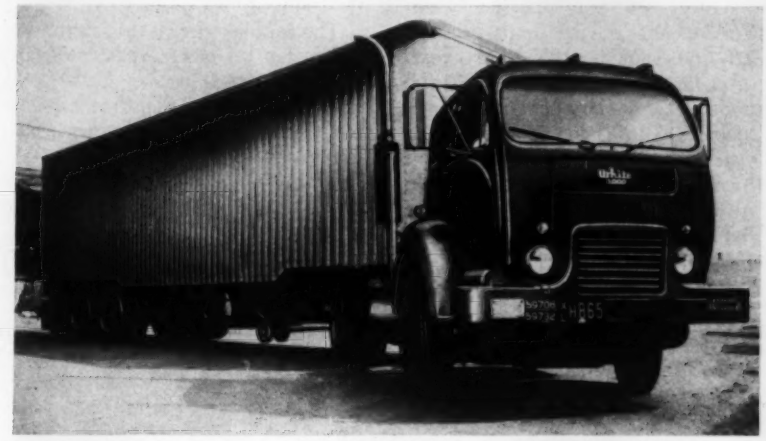
"It's Really **RUGGED** and Versatile"

"In our business," says Mr. Stanley McDonald,
Plant Foreman of E & M Enterprises, Inc. of Middleport, New York,
"building special machinery for a wide segment of industry, we needed
a horizontal boring machine that was rugged, accurate, faster,
easy to set up and control. We decided that the Bullard H.B.M., Model 75
best met our requirements. Now, after more than two years of operation,
we're convinced we made the *right* choice and bought the *right* machine."

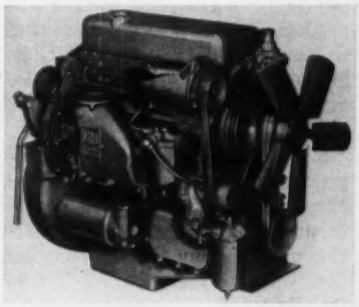
A call to the nearest Bullard Sales Office or Distributor will convince you that the Bullard H.B.M., Model 75 is the right choice for you.

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

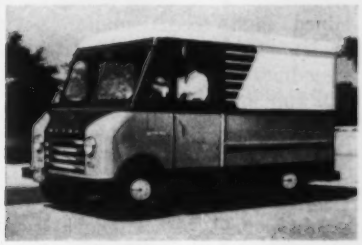
These Are Trend Setters . . . (gains in '58 sales over '57)



Tilt cabs 1.3%



Diesel engines 5.2%



Vans 9.6%

Truck Builders See '59 As Year of Recovery

AFTER A YEAR which saw less than 800,000 trucks sold in the U. S., domestic producers are looking for production of 1.1 million units and upwards of 950,000 sales in 1959. Higher prices, averaging 2.5 per cent on heavy duty rigs and around 3 per cent on light and medium jobs, are not expected to hurt sales because of the increased number of older commercial vehicles that must be replaced if companies want to curb truck operating costs.

Chevrolet Div., General Motors Corp., reports its December, 1958, deliveries of light trucks were almost 40 per cent higher than they were the year before. Herman P. Sattler, assistant general truck sales manager, expects similar results this month. "If we had been able to build our inventories, retail deliveries would have been even higher," he claims. Mr. Sattler says 1958 was the decade's low in truck sales. He adds: "To me this can only mean that hundreds of thousands of truck purchases have been temporarily deferred."

In the last five years, truck scrappage rates have ranged between 5.4 and 6.3 per cent, vs. 7.4 to 8 per cent for cars. The average age of the 11.4 million trucks in use has increased to 7.2 years. Licensed trucks increased by only 200,000 units during 1958—not enough to cover normal domestic growth, believes Mr. Sattler. *Ward's Automotive Reports* agrees. The industry's statistical publication estimates that two out of three of this year's truck sales will be trade-ins rather than "clean" deals.

More Diesel Sales in '59

Diesel powered trucks gained a larger share of the 1958 market. Independent truck builders held their 73 per cent share of the heavy duty market where most diesel engines are used. There's little doubt in the industry that the operating economies afforded by diesels make them a growing favorite among heavy duty builders. Some 42 per cent of the rigs used diesels last year, compared with 36 per cent in 1957.

General Motors' Diesel Engine Div. is convinced. It has boosted plant capacity 289,000 sq ft so it will be able to increase production 60 per cent on its newly announced line of 19 basic diesel engines—20 to 1650 hp vs. 30 to 893 before. It has been selling 2 cycle engines for over 1800 uses, ranging from industrial equipment and small trucks to heavy cruisers.

Now it has added a "53" (cubic inch displacement) series at the

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bottom of its line and four V blocks to its "71" series. The "53" group has a V-6, too. The "71" series increases horsepower by adding cylinders, or by teaming two turbocharged engines for marine use. Except for blocks and crankshafts, parts in the V series are interchangeable. Next year, GM Diesel hopes to offer its most popular V-6 model with gray iron or aluminum blocks.

Clyde W. Truxell, GM Diesel's general manager, feels his outfit is prepared to meet increased competition from 4 cycle diesels built by Cummins Engine Co. Inc., Columbus, Ind., and Caterpillar Tractor Co., Peoria, Ill.

Biggest advantage of diesels over gasoline engines: Their ability to operate more economically at sustained high speeds under heavy loads. Diesels are also lighter, sometimes offer lower fuel costs, and run longer between overhauls.

Tilt Cabs Gain, Too

Tilt cabs are making progress in the body field. Even though truck output dropped in 1958, tilt cab output for the year will slightly exceed 1957's 18,715 units, preliminary reports show. This year the figure may rise to 25,000 units, or 40 per cent of the 26,000-lb-and-over truck market.

Main reason for the move to tilt cabs: Tractor length is shortened, so more space can be used for payloads. Tilt cabs also make for easier maintenance.

Ford is the big builder. Its output accounted for 36 per cent of that market last year. International Harvester took 30 per cent; Mack, Diamond T, and White Motor Co. shared the rest.

This year the proportions will be changed as GMC Truck & Coach Div., Pontiac, Mich., starts full production of its newly introduced DLR-8000 tilt cab tractor next month. A second model is due before fall. Chrysler Corp.'s Dodge Div. is also investigating tilt cabs; it may buy from other makers.

Imports Spark Van Sales

Bigger bulk payloads, easy handling, and low operating and maintenance costs explain the growing acceptance of smaller van type trucks for short haul deliveries. They are replacing panel delivery trucks and pickups in commercial plants and service industries. They fill a slot that hasn't been covered by more conventionally designed trucks.

The boom was sparked when Volkswagen started importing its 7/8 ton vans in 1955. Last year, sales hit 20,000 (5 per cent of the under-6000-lb-class of trucks which include ½ to ¾ ton pickups). This year VW anticipates a 50 per cent increase in U. S. sales and thinks it has only tapped the market. The handy carryalls sell for $1845 (New York).

But Volkswagen may be in for a surprise. International Harvester brought out its van version last fall, and initial orders reportedly are running about 2600 a month. Ford supposedly will offer a light van truck along with its light car. Chrysler plans to import more of the smaller Simca delivery trucks. GM is surveying the market, and one company executive hints that the firm may have a similar model available before yearend. Apparently, the van trend is only beginning.

Truck Design Trends

Faced with prospects of stronger sales, truck builders are enthusiastic in their efforts to find lighter materials for chassis and bodies.

They're also involved in industry-wide standardization which will help in the long term campaign for interstate agreements on weights, lengths, and payloads. Some of the ideas turned up last week at the Society of Automotive Engineers' annual meeting in Detroit. C. V. Crockett, GMC's chief engineer, and one of his assistants, D. J. LaBelle, outlined a new design concept for lightweight highway tractors.

The new tractor features a 108 in. wheelbase which permits the transfer of an additional 2000 lb to the front axle, thus making for bigger payloads. The cab front end is 50 in. ahead of the front wheel center so trailers can be longer. A redesigned air suspension system lets GMC lower trailer floors 3 in. to give extra cargo space without increasing height.

One trailer body supplier is offering body wall sections of expanded polystyrene beads laminated between thin plywood sheets. The development is for trucks needing insulation. Besides corrosion resistance, the laminated sheets provide more structural strength. Some steel or aluminum framing members can be eliminated.

The supplier claims the laminated bodies are no more expensive than aluminum and just as light. As volume increases, the firm expects to beat aluminum body construction costs.

• **A Hurdle**—Despite the optimism about 1959, truckers still have one perplexing problem that's growing more complicated. The industry can choose among three types of tires and five types of rims. Tubeless tires need different rims than tube type jobs. The recently introduced wire cord tires must have their own rims. Tires are major maintenance items, and companies with large, varied fleets have to keep costly inventories on hand.

The aim is to develop a universal rim that can be used with all types of tires. It will eliminate class distinctions, although different sized rims will still be needed. Several universal rims have been built. If all goes well, the more hopeful members of the trucking fraternity think one can be adopted by 1961.

U. S. Auto Output

Passenger Only	1958	1957
January	489,357	641,519
February	392,112	570,650
March	357,049	578,356
April	316,503	548,656
May	349,474	531,413
June	337,355	500,266
July	321,053	495,625
August	180,324	524,363
September	130,426	283,862
October	261,696	327,362
November	514,099	578,600
December	593,926	534,714
Totals	4,243,374	6,115,458

Week Ended	1958	1957
Dec. 13	137,882	145,503
Dec. 20	135,964	140,447
Dec. 27	104,907	79,945
	1959	1958
Jan. 3	97,664	76,653
Jan. 10	134,342†	120,140
Jan. 17	135,000*	109,761

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

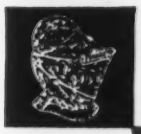
Why do dies need less maintenance in the Wean "Flying Press"?

Before answering the question, perhaps we'd better establish the fact: firms which have conducted comparative die life tests report that significant savings have been achieved with the "Flying Press." One company reported a 36% monthly reduction in die maintenance costs, noting that part production between die grinds on one run was increased from 4,000 to 123,000 pieces. Another "Flying Press" user reported that dies which had previously required repair every three weeks in a conventional press ran for a year with only one grind in the "Flying Press" . . . and turned out over 1 million parts!

The answer to this cost-cutting aspect of "Flying Press" operation lies in its unique design. Since the dies are in motion in the "Flying Press," they operate at a lower temperature than in conventional presses. Another factor is the higher punching velocity inherent in the "Flying Press" design, with its 600 strokes per minute top speed. Other "Flying Press" features . . . such as its lower bed suspension system which minimizes side thrust on the gibs, and its dynamic balance . . . also contribute to longer die life and sustained accuracy of press adjustment.

Finally, dies are protected against damage by the protective devices built into the "Flying Press" to detect "cobbles" and prevent double hits. And the "Flying Press" uses standard dies, so there's no special expense involved in its tooling.

Operating economy is just one more reason that you should investigate this outstanding piece of metalworking equipment if your plant uses stamped parts in quantity. We'll be happy to send you literature or arrange an appointment for a Wean sales representative to discuss the potential of the "Flying Press" for your specific production operations. May we hear from you?



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WEAN EQUIPMENT CORPORATION

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Lundberg cuts costs 11% by switching to Timken® hot-rolled seamless steel tubing on National Acme screw machines

TO cut costs, Lundberg Screw Products Company of Lansing, Michigan, investigated the possibility of using hot-rolled tubing on its National Acme screw machines. The question: were hot rolled tolerances adaptable to standard collets.

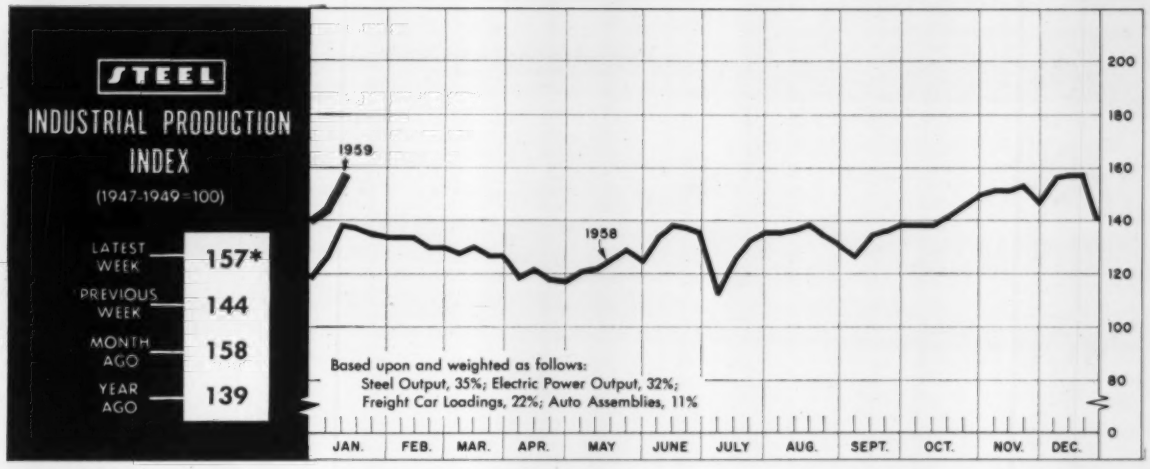
Timken Company sales engineers suggested they try hand chucking. Although hand chucking would mean a slight increase in time due to minor adjustments of collet tension, the material savings would more than offset the higher labor cost. And it did. The manufacturer found these adjustments added 1/10 of an hour per tube to production time. *But* the saving in material cost was *11%*.

Can hot-rolled Timken® seamless steel tubing save money for you? Call us and see. And to further increase your steel savings, ask Timken Company engineers to recommend the most economical tube size for your hollow parts job. We'll guarantee this size to clean up to your dimensions. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". Makers of tapered roller bearings, fine alloy steels and removable rock bits.

Timken alloy steel and seamless tubing is available from warehouse stock in 44 cities in the United States. Call your local Timken Company sales office for the name of your nearest Timken steel distributor.

TIMKEN® *Fine Alloy* STEEL

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



*Week ended Jan. 10.

Recovery Has Broad Geographic Base

YOU'VE heard a lot of talk about the broadness of the industrial base of the recovery. Equally important is the breadth of the geographic base. The uptrend has been felt from New England to southern California. But, as in the industrial base, the recovery has not been even.

• **East**—The New England industrial production index of the First National Bank of Boston is about halfway back up to its previous high. The bank feels the first quarter will be well ahead of the corresponding 1958 period, largely because of a relatively strong comeback in the durable goods sector.

The Guaranty Trust Co. of New York believes that the economy is still in the relatively early stages of the recovery. It cites several reasons behind its optimism for this year: 1. A further rise in consumer spending. 2. A slow rise in capital spending. 3. Inventory accumulation. 4. Increased government spending.

Most of the business indicators recorded by the Federal Reserve Bank of Philadelphia are showing plusses over year-ago periods. Especially active in the latest period were construction contracts (up 46 per cent) and department store sales (up 9 per cent).

Coming along slowly is the Pittsburgh area where steel is a big factor. The jagged trend line of the weekly index of business activity compiled by the University of Pittsburgh is about two-thirds of the way back to prerecession levels. With the steel outlook improving, conditions in this area should maintain the present course at least through the first half of 1959.

• **Midwest**—From Ohio to Kansas, conditions generally are paralleling the trend set by the Federal Reserve Board's industrial production index. The Cleveland Trust Co.'s index (it measures physical volume of industrial production) is

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,123[1]	2,085	1,538
Electric Power Distributed (million kw-hr)	13,000[1]	12,364	12,506
Bituminous Coal Output (1,000 tons)	6,965[1]	5,895	7,025
Crude Oil Production (daily avg—1,000 bbl)	7,100[1]	7,122	6,849
Construction Volume (*ENR*—millions)	$260.0	$273.2	$171.0
Auto, Truck Output, U. S., Canada (*Ward's*)	165,811[1]	117,862	146,024
TRADE			
Freight Carloadings (1,000 Cars)	570[1]	468	569
Business Failures (Dun & Bradstreet)	169	185	203
Currency in Circulation (millions)[3]	$32,008	$32,456	$31,553
Dept. Store Sales (changes from year ago)[3]	+3%	+3%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,426	$23,354	$25,630
Federal Gross Debt (billions)	$282.9	$283.2	$274.6
Bond Volume, NYSE (millions)	$38.0	$23.6	$24.7
Stocks Sales, NYSE (thousands of shares)	20,838	15,041	11,153
Loans and Investments (billions)[4]	$96.6	$95.9	$89.0
U. S. Govt. Obligations Held (billions)[4]	$31.9	$31.9	$26.4
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	239.15
STEEL's Nonferrous Metal Price Index[6]	217.3	216.9	201.2
All Commodities[7]	119.2	119.3	118.7
Commodities Other than Farm & Foods[7]	127.2	127.2	126.0

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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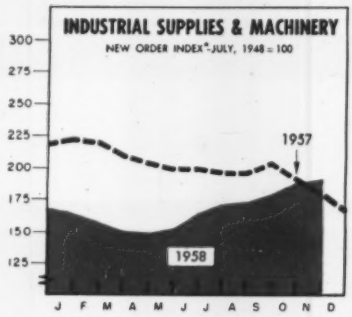
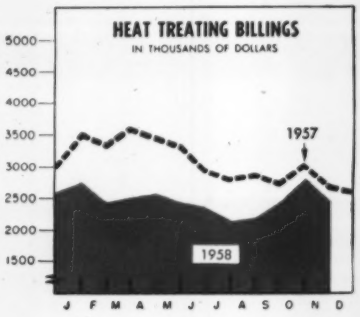
THE BUSINESS TREND



	1958	1957	1956
Jan.	163	221	190
Feb.	157	219	190
Mar.	149	210	190
Apr.	148	203	195
May	152	199	199
June	164	199	197
July	170	197	203
Aug.	172	197	211
Sept.	178	203	203
Oct.	187	192	206
Nov.	189	180	220
Dec.	...	167	218

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs.' Assn.



	1958	1957	1956
Jan.	2,780.4	3,533.9	3,116.4
Feb.	2,436.4	3,378.9	3,124.8
Mar.	2,495.4	3,631.8	3,330.9
Apr.	2,542.6	3,572.4	3,166.2
May	2,421.5	3,389.6	3,350.7
June	2,374.8	2,912.1	3,094.5
July	2,139.6	2,767.5	2,737.4
Aug.	2,213.0	2,830.8	3,136.6
Sept.	2,457.1	2,765.0	2,858.6
Oct.	2,744.9	3,076.2	3,468.5
Nov.	2,422.0	2,677.2	3,238.2
Dec.	.....	2,565.4	2,998.9

Metal Treating Institute.

Charts copyright, 1959, STEEL.

about 3 per cent above the population and long term growth trend.

In the Chicago area, the recovery is leveling off a bit after a rapid rise through late third and early fourth quarters of 1958. The local purchasing agents association reports that 66 per cent of its business survey respondents expect this quarter to be better than the last quarter of 1958, while only 7 per cent think it will be worse.

On the western fringe of this area, the Federal Reserve Bank of Kansas City reports that most business indicators are well above year-ago levels, but rising only moderately on a month-to-month basis. The biggest improvement in the latest period is in residential building permits, which are 152 per cent ahead of the year-ago mark.

• **Mountain Region**—In the tenth Federal Reserve District west of Kansas City the gains are not as pronounced as they are in the more industrial areas. This could be because the recession was not felt as much in agricultural areas.

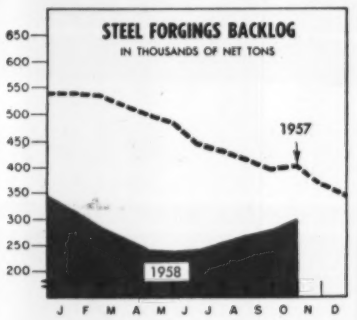
In Utah, the rise in production of steel (Columbia-Geneva Steel Div. of U. S. Steel Corp. has a big plant there) and the recovery in nonferrous metals have helped move the local economy from the minus into the plus column on a year-to-year basis. Building permits are also at an all-time high.

At the southern tip of the mountain region, the Valley National Bank of Phoenix, Ariz., continues to report a rising economy. Its index of Arizona business is at the highest point in history.

• **Far West** — In southern California, the recession was little more than a pause in the sharp uptrend which has characterized that area's economy for some years. The business activity index of the Security-First National Bank of Los Angeles is at an all-time high, although the uprush has slowed down a bit in the last two months. Despite a decline in aircraft (the section's No. 1 industry), total employment climbed in the latest period, counter to seasonal trends. During the first 11 months of 1958, the area saw 469 new or expanded industrial operations, compared with only 426 during the year-ago period.

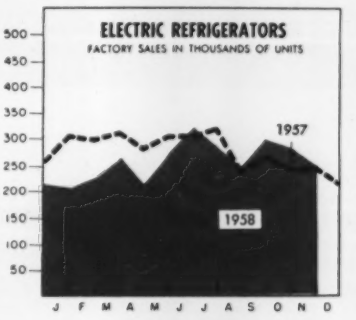
BDSA Forecasts Increases

Business gains in 1959 are going to range from 2 to 30 per cent, indicate these industry forecasts made



	Shipments		Unfilled Orders	
	1958	1957	1958	1957
Jan. ...	108	148	318	537
Feb. ...	93	135	288	533
Mar. ...	92	146	266	517
Apr. ...	83	139	242	497
May ...	78	135	240	479
June ...	87	128	242	445
July ...	67	104	257	431
Aug. ...	80	115	270	417
Sept. ...	89	117	280	397
Oct. ...	99	126	296	401
Nov.		105	...	365
Dec.		99	...	343

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.



	1958	1957	1956
Jan. ...	206,100	305,400	308,900
Feb. ...	227,800	298,700	316,000
Mar. ...	261,100	309,300	403,500
Apr. ...	210,800	281,600	353,300
May ...	262,900	303,700	346,800
June ...	316,300	305,100	354,400
July ...	279,700	318,000	351,000
Aug. ..	246,900	240,500	307,600
Sept. ..	296,200	265,200	277,300
Oct. ...	277,500	261,500	212,200
Nov. ...	245,500	246,400	211,600
Dec. ...	.....	214,600	257,400
Totals .	.....	3,350,000	3,700,000

National Electrical Mfrs. Assn.

by the Business & Defense Services Administration:

- Auto production—up 30 per cent.
- Truck production—up 20 per cent.
- Trucktrailer production—up 21 per cent.
- Electrical equipment sales—up 10 per cent.
- Cutting-type machine tool shipments—up 2 per cent.
- Forming and shaping type machine tool shipments—up 5 per cent.
- Electronics production—up 14 per cent.
- Lead consumption—up 5 per cent.
- Zinc consumption—up 9 per cent.
- Aluminum shipments—up 20 per cent.
- Magnesium shipments—up 20 per cent.
- Appliance sales—up 5 per cent.
- Material handling equipment production and sales—up 20 per cent.
- Air conditioning and refrigeration equipment sales—up 13 per cent.
- Construction machinery shipments—up 18 per cent.
- Farm machinery production—up 8 per cent.
- Communication equipment sales—up 3 per cent.
- Typewriter sales—up 18 per cent.
- Scientific instrument sales—up 13 per cent.
- Ferrous casting sales—up 10 to 12 per cent.
- Ferralloy production and shipments—up 25 per cent.
- Steel production—up 24 to 30 per cent.
- Construction—up 4 per cent (in constant dollars).
- Container shipments—up 2 to 5 per cent.

Orders, Shipments Climb

For the seventh consecutive month, manufacturers' shipments of durable goods climbed in November, rising from October's $12.9 billion to $13.4 billion. Orders edged up for the third month in a row (there was a dip in August), reaching $13.7 billion. Stronger auto production contributed to the gain in shipments.

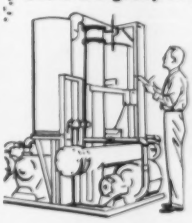
For the first time since inventory liquidation started in 1957, durable goods stocks failed to decline, holding at October's level of $27.9 billion, seasonally adjusted. Durable goods backlogs also halted their downtrend by climbing $300 million to $43.7 billion. The rise was centered in the transportation industry.

Carl G. Paulson, Director of Hayes Research and Development Group, Reports...

NEW NITROGEN POTENTIALS

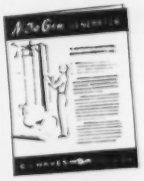
Assume you face the need for high purity nitrogen at a low per-unit cost figure. You want to use it as a heat treating atmosphere . . . or as a "blanket" for hydrocarbons or food products . . . or for any one of a number of industrial applications. How can you bring this safe, inert gas out of the lab and into general use without inflating your costs?

Our R & D group reasoned that a low cost generator was the logical solution and followed up and developed a completely new piece of equipment—the C. I. Hayes "Nitro-Gen." This unique combination of stationary retort and cyclical programmed dryer has cleared the way for production of 99.99% pure inert gas at approximately 20c per thousand cubic feet.



The immediate benefits of low cost nitrogen as a protective heat treating atmosphere were revealed in initial metallurgical applications. For example, test bars of Type 8670 Carbon Steel were subjected to routine hardening under (1) nitrogen, (2) dissociated ammonia, and (3) endothermic gas atmospheres—each test followed by routine oil quench and tempering. Hardness results from these tests proved identical . . . but a substantial boost in toughness showed up in the bars treated under nitrogen. The nitrogen atmosphere produced 100% greater toughness, according to a transverse break test.

Safety alone makes nitrogen worthy of careful consideration. If this non-combustible gas can be produced efficiently and economically (and we're doing it!), Hayes Research and Development Engineers believe its potential — in heat treating and in *other "blanketing" operations* — is virtually unlimited. For further details on the new "Nitro-Gen" . . . now being demonstrated in our lab . . . request technical data.



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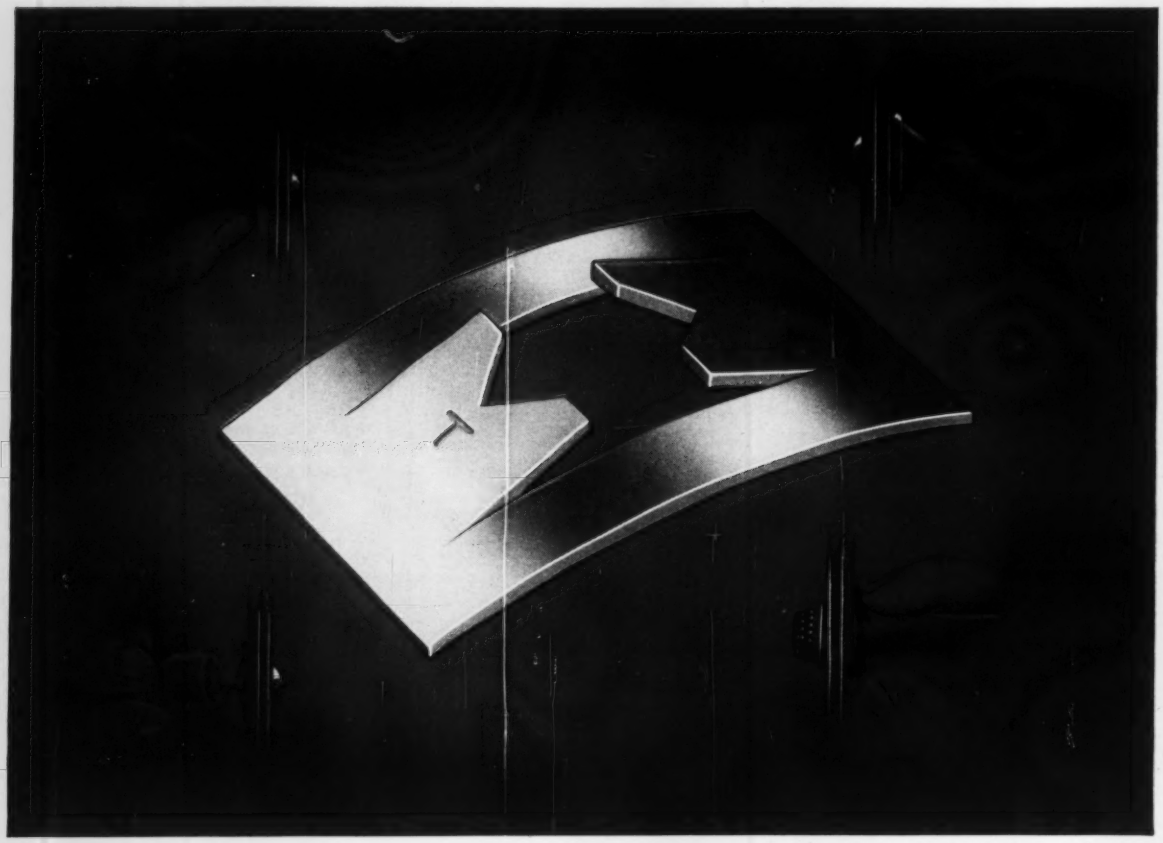

Another Tinnerman Original...

Tinnerman Push-On **SPEED NUTS®** fasten with a "bite" that can't shake loose

In a split-second, this low-cost Tinnerman Push-On SPEED NUT arches its spring-steel back, then bites hard to make a positive attachment on unthreaded studs, rivets, tubing, nails, jewels, small housings.

Application is easy—finger pressure starts it; a push with a simple hand tool locks it under live spring tension. No threads to worry about, no spot welding, no riveting, no special inserts, bushings or washers necessary. Elimination of extra parts and assembly operations may save you up to 50% or more in fastening costs.

Push-On SPEED NUTS lock on everything from thermoplastics to die-cast, chrome-plated steel. Hundreds of variations to fit any shape or size stud —from very small diameters to larger rectangular shapes. Some Push-Ons have "caps" that cover exposed shaft, axle or stud ends.

Check Sweet's Product Design File, section 8-T. Or look under "Fasteners" in the Yellow Pages and call your Tinnerman representative for complete information and samples. Or write to:

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CHARLES W. CRAVENS

JOHN R. LOWEY

Republic-Cleveland steel plant posts

JOHN B. KOPP

JAMES R. MORAN

Ingalls Iron Works vice presidents

Charles W. Cravens was named manager of the Cleveland steel plant of **Republic Steel Corp.** He succeeds **Mowry E. Goetz,** retired. Former assistant district manager, he is succeeded in that post by **John R. Lowey,** who was general superintendent.

Howard S. Kaltenborn was named vice president and assistant to president, **Westinghouse Electric Corp.,** Pittsburgh. **Dr. S. W. Herwald,** manager, Air Arm Div., Baltimore, was elected vice president-research.

Donald R. Miller was appointed works manager, **W-S Stainless Steel Works,** Forge & Fittings Div., H. K. Porter Company Inc. The works are in Duncannon, Pa. Mr. Miller was production manager of Curon Div., Quehanna, Pa., Curtiss-Wright Corp.

Dr. Albert Muller, assistant to the president of **Air Reduction Sales Co.,** New York, a division of Air Reduction Co. Inc., was appointed vice president of the division. Prior to joining the division in 1957, he was director of metallurgical research at the firm's Central Research Laboratories, Murray Hill, N. J.

Convair Div., San Diego, Calif., General Dynamics Corp., elected **August C. Esenwein** executive vice president. He was vice president and general manager, Ft. Worth plant. **J. G. Zevely,** director-contracts and commercial sales, was made vice president-contracts and commercial sales. **Elmer P. Wohl** was elected vice president-planning. **Frank W. Davis,** chief engineer at the Ft. Worth plant, was made vice president and general manager there, and **Robert H. Widmer** was made chief engineer.

Herman F. Kaiser was made division superintendent of **Republic Steel Corp.'s** Canton, Ohio, steel plant. He is succeeded as superintendent of the blooming mill by **Raymond C. Moore. Herbert C. Johnston** succeeds Mr. Moore as assistant superintendent.

John F. Hartford was made assistant works manager of **Kropp Forge Co.,** Chicago. He was forge plant superintendent at Utica Drop Forge & Tool Corp. Other appointments at the Chicago plant: **Raymond Greiner,** former assistant quality manager at Utica Drop Forge, named forge shop superintendent; **Frank Lakey,** former chief design engineer for Champion Forge Co., Cleveland, appointed chief die designer.

Frank B. Jewett Jr. was elected executive vice president, **Vitro Corp. of America,** New York. **William B. Hall** was elected a vice president. Mr. Jewett succeeds **Adm. Albert G. Noble,** USN, ret., who, as a vice president of the corporation, will devote his efforts to Vitro's research and development in the field of national defense, and establishment of a weapon systems group of Vitro companies.

Furman A. McClelland was made general sales manager; **C. Norman Reeves,** assistant general sales manager, **Wheeling Steel Corp.,** Wheeling, W. Va.

Ingalls Iron Works Co., Birmingham, elected **John B. Kopp** vice president - operations; **James R. Moran,** vice president-industrial relations. Mr. Kopp was assistant vice president - operations. Mr. Moran was assistant vice president-director of industrial relations.

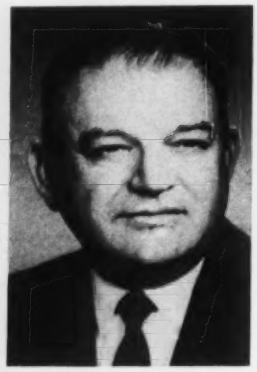
Eric G. Boehm was made assistant general manager, **Buffalo Bolt Co.,** Buffalo, a division of Buffalo-Eclipse Corp. For the last 20 years, he has been with Houdaille Industries Inc. and its predecessor companies, and recently was general manager of its Buffalo Hydraulics Div.

American Steel & Wire Div., U. S. Steel Corp., appointed **B. M. Ashbaucher** sales manager-western area, Chicago, to succeed **Clarence T. Gilchrist,** retired. **Stuart W. Goodenough** succeeds Mr. Ashbaucher as Chicago district manager. Mr. Goodenough is replaced by **Robert H. Hauger** as manager of manufacturers' products - Chicago district sales office, and **David P. Philips** was made assistant manager.

Dr. C. E. Oelker was appointed director of engineering for the Cincinnati Div. of **Bendix Aviation Corp.**

Wilfred R. Ogg, Chicago district manager, Grinding Machine Div., **Norton Co.,** was made manager of distributor sales for the division, a new post. He will also have charge of export sales for the division. **Calvin K. Kirk** succeeds Mr. Ogg as Chicago district manager. **Thomas D. Bushman** succeeds Mr. Kirk as product research engineer. **Stanley**

RAYMOND B. AUFMUTH
H. K. Ferguson chief eng.



NORMAN J. KIRK
Toledo Pipe Threading pres.

ALBERT W. BRANDMAIER
Consolidated Electro post

R. L. DICKSON
Walter Kidde exec. v. p.

B. Wetherhead was made Norton's Pacific Coast district manager at Los Angeles.

Raymond B. Aufmuth was made chief engineer, **H. K. Ferguson Co.**, Cleveland. He was staff engineer in the main office, Cleveland, engaged in furthering expansion of the firm's design and construction activities in the steel industry.

George Hamberger, former northeast regional sales manager, was named sales manager for stainless tubular products of **Union Steel Corp.**, Union, N. J.

Thomas E. Peacock, former manager of market research, was appointed to the new post of marketing manager at **Exide Industrial Div.**, Electric Storage Battery Co., Philadelphia.

James M. Golden, division manager, was elected vice president-Western Div., **Titan Metal Mfg. Co.** His headquarters are in the new Titan plant at Newark, Calif.

Norman J. Kirk was appointed president and general manager, **Toledo Pipe Threading Machine Co.**, Toledo, Ohio. He was with Standard Steel Spring Co., most recently as general manager of its Newton Falls Div.

Albert W. Brandmaier was made director of European operations for **Consolidated Electrodynamics Corp.**, Pasadena, Calif., a new post. He continues to direct European marketing operations and activities of the corporation's German subsidiary, from headquarters in Frankfurt am Main, West Germany.

Robert N. Whitney was appointed purchasing agent, **Miniature Precision Bearings Inc.**, Keene, N. H., to succeed **Leo Vogel**, promoted to staff assistant at MPB, a new post. Mr. Whitney was assistant purchasing agent.

Walter C. Fisher was made director of marketing; **James D. Dougherty**, sales manager, **Norge Div.**, Chicago, Borg-Warner Corp.

R. L. Dickson was elected executive vice president, **Walter Kidde & Co. Inc.**, Belleville, N. J. He has been administrative vice president since 1957.

Dan O'Leary was elected president, **Controls Co. of America (Canada) Ltd.**, Cooksville, Ont. He succeeds **Remy Ludwig**, who as vice president, International Div., will devote more time to operations in Europe and South America. Mr. O'Leary was vice president and general manager.

J. Vance Foster was promoted to applications engineering manager, **Potter & Brumfield Inc.**, Princeton, Ind. He replaces **Roger Kish**, now with Martin Co. in Denver.

Charles J. Miller, former vice president, was named president, **P. & M. Co.** and **Maintenance Equipment Co.**, both divisions of Poor & Co., Chicago.

Lester E. Butzman Jr. was made sales manager, **Elgin Metalformers**

JAMES M. GOLDEN
Titan Metal div. v. p.

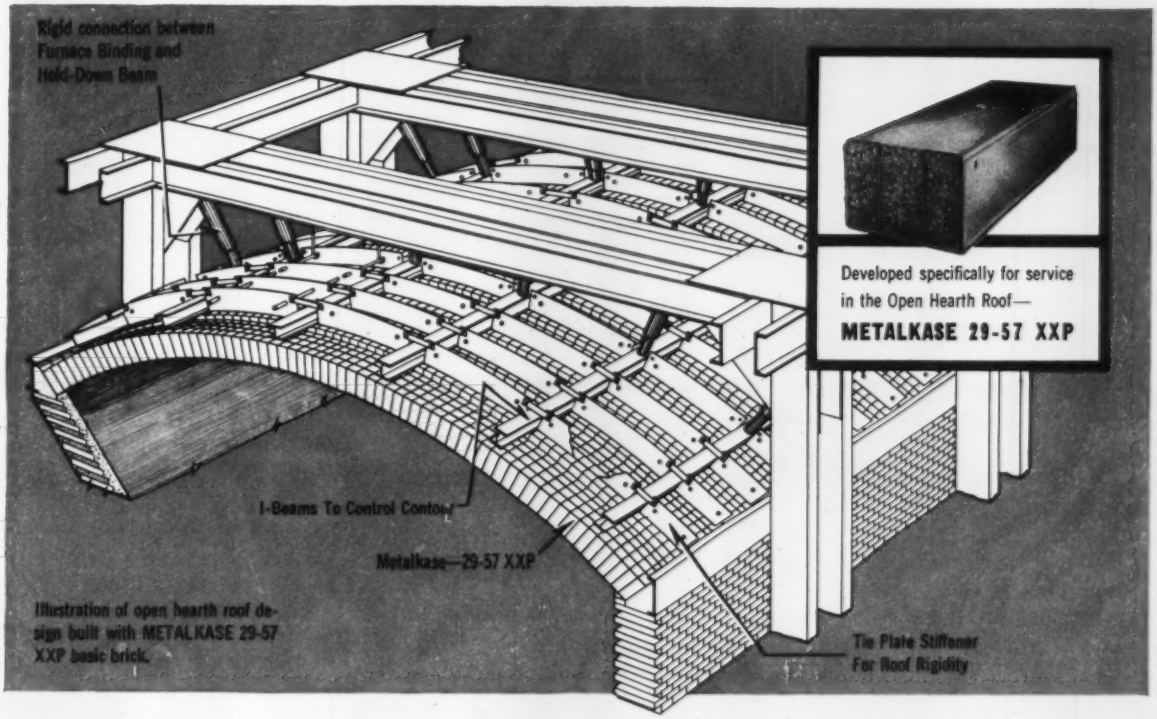
ROBERT N. WHITNEY
Miniature Precision p. a.

WALTER C. FISHER
Norge marketing dir.

CHARLES J. MILLER
heads Poor & Co. divs.

With Harbison-Walker Refractories

LONGER SERVICE and INCREASED TONNAGE in the ALL-BASIC open hearth


Rigid connection between Furnace Binding and Hold-Down Beam
Developed specifically for service in the Open Hearth Roof—
METALKASE 29-57 XXP
I-Beams To Control Contour
Metalkase—29-57 XXP
Illustration of open hearth roof design built with METALKASE 29-57 XXP basic brick.
Tie Plate Stiffener For Roof Rigidity

Accelerated progress in open hearth steel furnace practice involving larger furnaces, increased use of oxygen and higher rates of production creates demands for superior refractories. With the all-basic open hearth furnace becoming an economical reality, the development of new refractories having decidedly enhanced properties has been necessary. Harbison-Walker conventional and specialized basic refractories are meeting these requirements and winning widest approval.

A fundamental development in the achievement of the all-basic furnace is the metal encased basic brick pioneered more than forty years ago by Harbison-Walker. Through constant research and extensive application experience, rapid evolutionary progress has resulted in the successful use of the metal encased basic brick for open hearth roofs, as well as for other furnace parts.

METALKASE 29-57 XXP internally plated metal encased basic brick is used in both sprung and suspended open hearth roof constructions of all designs with unmatched service records. An exceedingly important contributor to the excellence of this refractory, developed specifically for the purpose, is the high purity magnesia produced by Harbison-Walker from Michigan brines. Fully stabilized as periclase of high density, it is an important constituent of this refractory having outstanding properties for the particular application.

The successful use of basic brick for roofs contributes to greater severity of conditions imposed upon other furnace parts. Harbison-Walker basic refractory products long established with excellent records, together with the newer specialized brands fulfill these rigid requirements for bottoms—walls—and regenerator checkers and make **THE ALL-INCLUSIVE, ALL-BASIC** Open Hearth Steel Furnace a reality.

HARBISON-WALKER REFRACTORIES COMPANY

AND SUBSIDIARIES — GENERAL OFFICES: PITTSBURGH 22, PA.

World's Most Complete Refractories Service

CHARLES F. MYERS
Van Norman Industries pres.

LLOYD A. THACHER
Electro Products div. post

ALBERT MUSSCHOOT
Carrier Conveyor post

RAYMOND G. REIFF
American Metallurgical post

CHARLES W. DIVEN JR.
asst. to Sharon president

WALTER A. GARRETT
Brainard Steel Strapping post

Corp., Elgin, Ill. He was with Hess Co., Chicago.

Raymond G. Reiff was named foundry service manager, **American Metallurgical Products Co. Inc.**, Pittsburgh. He was supervisor of the quality control laboratories of Ford Motor Co.'s Dearborn, Mich., iron foundry.

Louis W. Mason was made sales manager-eastern area; **James G. Morrison**, sales manager-central area for **National Tube Div.**, U. S. Steel Corp. Mr. Mason succeeds the late **Andrew P. Happer** in New York, and supervises sales offices in Boston, New York, Philadelphia, and Atlanta. Mr. Morrison succeeds Mr. Mason at Chicago, supervising sales offices in Chicago, Pittsburgh, Detroit, and St. Louis.

A. T. Enk was made manager, Design Dept., **Surface Combustion Corp.**, Toledo, Ohio.

Master Screw Products Co. Inc., Chicago, appointed **Leonard Kowalski** president and general manager.

Charles W. Diven Jr. was made assistant to the president and manager of customer relations for **Sharon Steel Corp.**, Sharon, Pa. He is responsible for scheduling, processing, customer service, and claims. He was assistant general manager of sales. **Walter A. Garrett** was made assistant general manager, **Brainard Steel Strapping Div.**, Warren, Ohio. Other appointments at Brainard: **J. Walter Angell**, made assistant to the general manager in charge of sales of all products; **John D. Boyer Jr.**, manager of field engineering; **Fred S. Seybert**, chief engineer in charge of industrial and plant engineering, and tool and product development; **Richard A. Wolschlag**, field sales manager.

Alfred Provencher was made Chicago district manager, **Arcos Corp.** He headed the New England office in Boston for two years, and is replaced by **Carl Gage.**

Textile Machine Works, Reading, Pa., appointed **John V. Sutton** manager of its new Contract Div.

Charles F. Myers was elected president of **Van Norman Industries Inc.**, New York. Elected executive vice president last November, he was formerly president of Morse Twist Drill & Machine Co., a division of Van Norman in New Bedford, Mass.

Lloyd A. Thacher was made general manager and sales manager, Proximity Transducer Div., **Electro Products Laboratories**, Chicago. He was assistant sales manager at Electro Products Laboratories.

Albert Musschoot was appointed director of research and development for **Carrier Conveyor Corp.**, Louisville. He was with Link-Belt Co.

J. Harvey Rowland was elected president, **Phoenix Bridge Co.**, Phoenixville, Pa., subsidiary of Barium Steel Corp. A vice president for ten years, Mr. Rowland continues as general manager.

C. A. Hanson was named president, **James Mfg. Div.**, Rockwood & Co., Ft. Atkinson, Wis.

Frederick H. Moschel Jr. was made sales manager at the Pittsburgh warehouse of **Jones & Laughlin Steel Corp. Richard Doughton Jr.** was made supervisor of product development for J&L's Stainless & Strip Div. in Detroit.

Firestone Steel Products Co., Akron, subsidiary of Firestone Tire & Rubber Co., appointed: **Walter S. Kidder**, general sales manager; **W. H. Vaughn**, Detroit sales manager; **C. C. Cupp**, manager of rim and wheel sales. **James B. Call**, former production manager of the Akron steel products plant, was made administrative assistant to Mr. Kidder.

James M. Thomas was made sales manager in Oregon for North Pacific Div., **Armco Drainage & Metal Products Inc.** He succeeds **George Schwarz**, retired.

John E. Bobbin was made sales manager, **Branson Instruments Inc.**, Stamford, Conn. He was with Sperry Products Inc. **H. F. Osterman** was made sales manager of the subsidiary, **Branson Ultrasonic Corp.**

George Ramsden was made assistant general manager for **Link-Belt Co.**'s North Central Div., with

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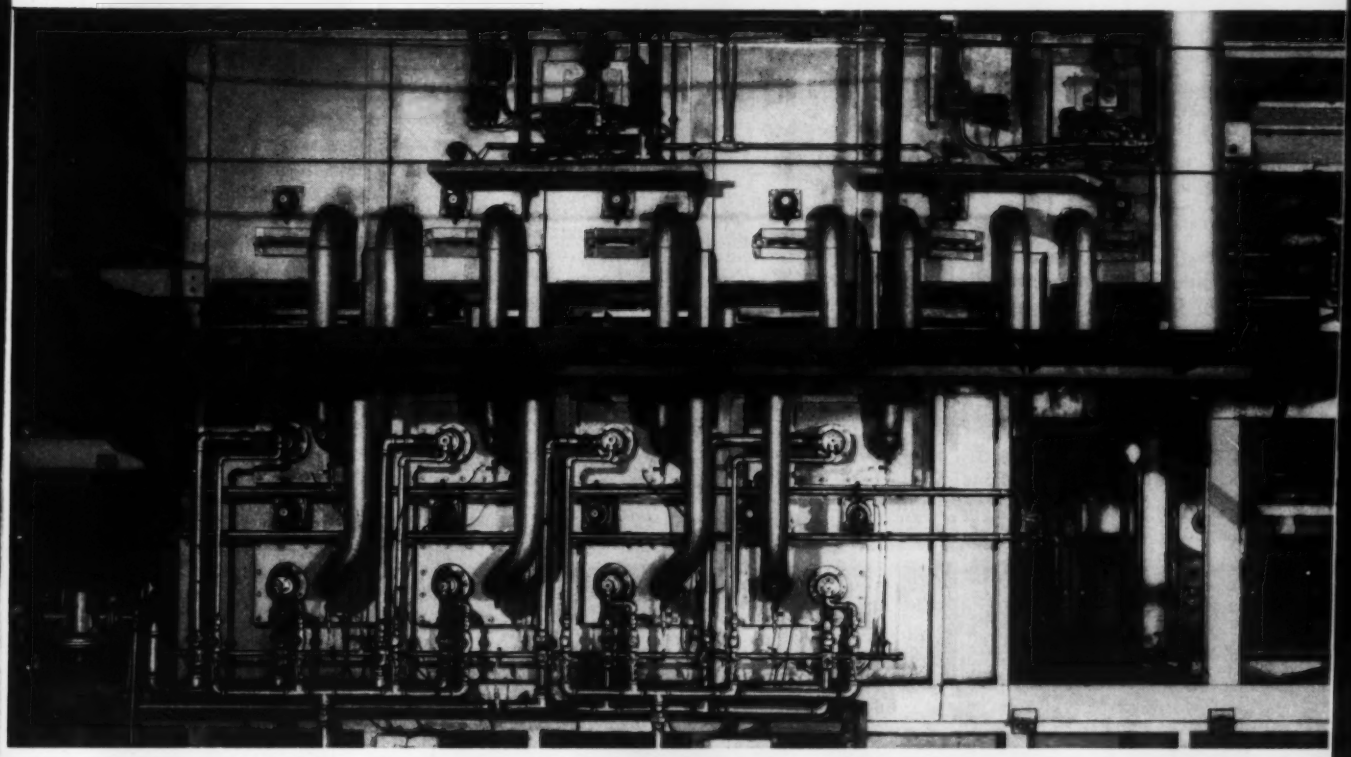
ROTOBLAST® STEEL SHOT

✓ Vacuum Casting

Electric furnace alloy steel, for the first time shotted in revolutionary vacuum chamber for greater density, eliminating voids and defects. You get a fatigue resisting shot for better, faster cleaning.

✓ Continuous Heat Treating in Controlled Atmosphere

Uniform heating for every particle, in controlled atmosphere (zero oxygen), gives you ball bearing, heat treating quality for uniform hardness and longer wear life.



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Pangborn

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Rotoblast® Steel Shot

D. G. GILMORE J. R. CLARK FORBES MANN

promotions at Chance Vought Aircraft Inc.

headquarters at the Minneapolis plant.

Chance Vought Aircraft Inc., Dallas, appointed **D. G. Gilmore** director of production; **J. R. Clark**, director of engineering; **Forbes Mann**, director of sales and service. The promotions follow appointment of **R. C. Blaylock**, former vice president-engineering, to vice president-general manager; and of **G. K. Johnson**, former vice president-production, as vice president in charge of the company's business planning, and as president of Genesys Corp., new electronics subsidiary in California.

Robert M. Clarke was elected vice president-sales, **Eastern Steel & Metal Co.**, West Haven, Conn.

J. F. Johnson was made assistant vice president-export, **National Steel Corp.**, with headquarters in New York. He heads the newly created export division, which controls overseas operations of all National Steel divisions. He was assistant vice president-sales for Weirton Steel Div., with offices in New York. **J. J. Munns**, executive vice president of National Steel, has retired.

Allis-Chalmers Mfg. Co., Milwaukee, appointed **Frank M. Scott** manager, utility sales; **Joseph N. Banky**, manager, heavy industrial sales; **Henry W. Schaub**, manager, processing industry sales; and **Stanley E. Bovim**, manager, general industrial sales.

George S. Chiaramonte was made sales manager of Sheffield Corp.'s **Cogsdill Twist Drill Div.** and **Threadwell Tap & Die Div.** in Greenfield, Mass. For 11 years, he was sales manager of E. Horton & Sons Co., which later became the Horton Div. of United-Greenfield Corp.

George R. Metzdorf was appointed manufacturing vice president, a new post at **Capitol Products Corp.**, Mechanicsburg, Pa. He was director of manufacturing, York Div., Borg-Warner Corp.

J. F. JOHNSON
National Steel export post

GEORGE R. METZDORF
joins Capitol Products

FRANK M. RYAN
Norton Behr-Manning v. p.

Thomas G. Lewis was appointed purchasing agent, **Youngstown Sheet & Tube Co.**, Youngstown. **William B. Seeman** was made group leader, buyer. Mr. Lewis succeeds **J. D. Sloan**, vice president-purchasing.

Dr. William A. Thomas, vice president-engineering, Electric Products Co., Cleveland, was named manager of corporate research and development for Square D Co., Milwaukee. **Mitchel P. Kartalia**, manager of the Marketing Div., was elected a vice president.

Faultless Caster Corp., Evansville, Ind., appointed **C. Bernard Noelting** general sales manager for all divisions, and assistant to the president. **John R. Stallings** was made sales manager, Caster Div.; **Richard W. Butsch**, sales manager, Furniture Hardware Div.

Sands G. Falk was named eastern regional sales manager, **Falk Corp.**, Milwaukee. He succeeds **H. Douglas Stier**, retired. Mr. Falk was manager of marketing research. He remains in Milwaukee. The western region was divided into two sales regions, and **Kenneth O. Hood** is manager of the new midwestern region, Milwaukee; **Edward E. Forslund** heads the Pacific Coast region, Los Angeles.

Harold A. Tucker was made manager of marketing research for **Metal Goods Corp.**, St. Louis. He was marketing research manager for Brainard Steel Div., Sharon Steel Corp.

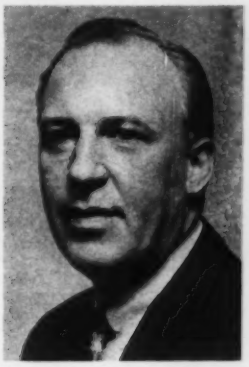
M. D. Corner was made Chicago district contracting manager, **American Bridge Div.**, U. S. Steel Corp.

Frank M. Ryan, vice president, was made vice president and general manager, **Norton Behr-Manning Overseas Inc.**, a division of Norton Co., Worcester, Mass. **Fordyce B. Scott**, former general manager of Behr-Manning de France, transfers to the company's main office at Worcester as vice president-sales of Behr-Manning tape and coated abrasive products. **Louis J. Camarra**, former European regional manager, returns to Worcester as vice president-sales of Norton abrasive and refractory products. Both Mr. Scott and Mr. Camarra report to **Dr. Wilfred F. L. Place**, NBMO vice

CHARLES L. CATT
joins Atkins Saw Div.

ALLEN H. JONES
W. W. Sly Mfg. v. p.

PAUL C. ELY
National Tube operations post



JAMES M. STONE
Solar Aircraft-Des Moines post

president, who will be in charge of all overseas operations.

Charles L. Catt was named manager of production and material control for **Atkins Saw Div.**, Indianapolis, Borg-Warner Corp. He was manager of production control at Rheem Automotive Co., Fullerton, Calif. Mr. Catt succeeds **Carl Ingels**, new manager of manufacturing.

U. S. Steel Corp., Pittsburgh, appointed **Walter R. Trognitz** assistant chairman, operating committee-iron production; and chairman, operating committee-sintering. **William H. Jewell** succeeds Mr. Trognitz as division superintendent of blast furnaces at Edgar Thompson Works.

Paul F. Smith, general manager, was elected president, **Parker Seal Co.**, division at Culver City, Calif., of Parker-Hannifin Corp. **Scott A. Rogers**, assistant general manager, was made vice president; **T. J. McCuistion**, sales manager, was made vice president-sales.

At **General Electric Co.'s** Metallurgical Products Dept., Detroit, **Ray F. Parker**, formerly manager of cutting tool sales, fills the new post of manager of carbide sales; **Grant A. Morrison**, as manager of carbide application engineering, heads a new function.

T. W. Kelly was made sales manager, Chicago Div., **Lamson-Sessions Co.**

At the Chemical & Metallurgical Div., **General Electric Co.**, Pittsfield, Mass., **Dr. George E. McCullough** was made polycarbonate manufacturing manager; **Dr. Leroy S. Moody**, polycarbonate engineering manager.

Allen H. Jones was elected vice president-sales and engineering, **W. W. Sly Mfg. Co.**, Cleveland. He was director of engineering.

Paul C. Ely was appointed assistant vice president-operations, **National Tube Div.**, United States Steel Corp., Pittsburgh. He was general superintendent of National Tube's Gary (Ind.) Works. He is now in charge of tubing specialties manufacturing.

Stephen Gibbons was appointed assistant sales manager for **Trent Inc.**, Philadelphia.

Charles S. Putnam was made general manager, **Wheeler Reflector Co.**, Hanson, Mass.

James B. Rafter was appointed assistant manager, stainless bar and wire sales, a new post at **Armco Steel Corp.**, Middletown, Ohio. Former special assistant to the general sales manager, he retains offices at Baltimore.

Fred W. Bainbridge was promoted to assistant vice president and sales manager, Railroad Div., **Pullman-Standard Car Mfg. Co.**, Chicago.

Ralph R. Falkner was made purchasing agent of the Bessemer, Ala., plant of **Pullman-Standard Car Mfg. Co.**

John G. Dorrance joined **SI Handling Systems Inc.**, Easton, Pa., as a vice president. He was with Lamson Corp.

Charles N. Chalfant was appointed product manager-metal finishing for **Kelite Corp.**, Berkeley Heights, N. J. **Eugene D. Schunke** was made manager of finance; **H. J. Bystricky**, manager of internal control.

James M. Stone was named assistant general manager, Des Moines, Iowa, Div., **Solar Aircraft Co.** He continues to direct the production control activities.

Philip Behr was elected president of **Joseph Behr and Sons Inc.**, and **Behr Machinery & Equipment Corp.**, Rockford, Ill. Former executive vice president, he succeeds the late **I. J. Behr.** Other appointments: **Benjamin Behr**, executive vice president; **William Daniel** and **A. H. Rosenbloom**, vice presidents.

W. H. Schomburg was made assistant general sales manager, **Dana Corp.**, Toledo, Ohio, to replace **L. L. Dodge**, recently named vice president-administration.

OBITUARIES...

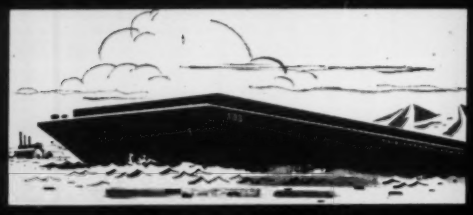
Charles S. Redding, 75, chairman and former president, **Leeds & Northrup Co.**, Philadelphia, died Jan. 2.

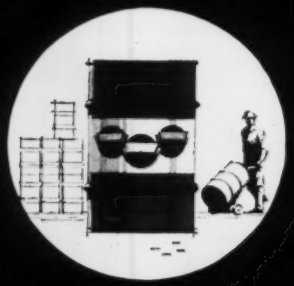
James W. Wilcox, 62, executive vice president and treasurer, **Columbus Coated Fabrics Corp.**, Columbus, Ohio, died Jan. 4.

W. S. Brackett, 60, vice president-engineering, **Union Carbide Chemicals Co.**, division of Union Carbide Corp., New York, died Jan. 8.

John E. Obernesser, 65, former works manager, Milwaukee plant, **International Harvester Co.**, died Jan. 2.

Homer L. Mueller, former vice president - sales manager, **Cleveland Welding Co.**, division of American Machine & Foundry Co., died Jan. 7.

BY  THE BARGELOAD OR...

BY THE DRUM,  YOU

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Whether you order 500 pounds or 500 tons from Ohio Ferro-Alloys, you can always count on: 1) Meticulously careful attention to your order; 2) Complete, experienced metallurgical assistance; 3) Consistently high and uniform quality. At Ohio Ferro-Alloys our attitude is this: the most important order we get is **your** order.

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NEW HI-TEMP ALLOY— Iron-aluminum-manganese alloys combine lightness, cold workability, high temperature strength, and oxidation resistance, says the Navy and National Research Corp., Cambridge, Mass. Some characteristics cited: The new steel family is austenitic; it is 15 per cent lighter than 18-8 stainless and up to 25 per cent lighter than cobalt and nickel superalloys; expected tensile strength approaches 250,000 psi; oxidation resistance at 1500° F is 0.0065 in. after 100 hours; machinability is about equal to that of Type 304 stainless.

PROGRESS IN NICKEL PLATING— Electrolytic casting, an extension of electroforming, has been used to make nozzles up to 12 ft long. The parts, destined for supersonic wind tunnels, have to meet extreme standards of precision in shape and dimensions. Another tip: You might try chemical plating for irregular shapes too tough to electroform.

ELECTRICITY FROM HEAT—A unit about the size of a quart fruit jar generates about 5 watts of electricity when its hot junction is heated to 1000° F. It was developed to improve the efficiency of hot machinery like atomic reactors. The device is made by Minnesota Mining & Mfg. Co., St. Paul. Efficiency of the air-cooled version is 6 per cent. Water cooling could raise it to 25 per cent.

BETTER VACUUM COAT— A new process puts a flat, nonporous coating on infrared reflectors that is 80 per cent cheaper and more durable than those produced by hard anodizing, says the Military Products Div., Singer Mfg. Co., New York. The reflector is part of a military device that rotates at 5000 rpm, a requirement that demands unusually effective mirror coatings.

STRESS RAISER— Photostress is a new way to quickly and accurately analyze stress concentrations, says Budd Co., Philadelphia. Parts to be checked are either polished or sprayed with reflective aluminum paint, then covered with a clear plastic developed by Dr. Felix Zandman, director of research, Tatnall Measuring Systems, a Budd Co. subsidiary. (The plastic can be brushed on or applied in sheets.) As a load is applied to the part, polarized light clearly shows the stress pattern.

ONE STROKE DRILL-TAP— A new automatic machine drills and taps 5/16 in. holes in an aluminum diecasting in one stroke. The secret is a combination two-flute tap. Ordinary drill points are ground on the end. Production people say they get 5000 holes per tool and high grade threads. Rate: 600 parts an hour.

LIGHT ARMOR— New fabricating methods make magnesium-lithium alloys suitable for Army tank armor, says Armour Research Foundation, Chicago. The development is said to save some 80 per cent of the weight of similar steel parts.

MORE ADHESIVE DATA— The Air Force says the strength of adhesive bonds in aluminum and stainless is affected by surface preparation, curing, aging temperature and time, atmosphere and stress during aging. It also found that aluminum bonds stressed at 300 to 400° F became 30 per cent stronger at minus 70° F. Rapid temperature changes from 450° F to minus 55° F produced no failures.

RUSSIAN FINISHING— Electromechanical smoothing shows promise as a technique for finishing machined surfaces. That's the conclusion to be drawn from recent Russian reports. A high current at low voltage passes through a tool into the work, heating projecting ridges—under the tool pressure, the ridges are deformed and smoothed. The surface is said to be harder and provides better wear resistance.

PORTABLE ATOMIC ENERGY— Nine firms are proposing 1000 to 2000 kw atomic powerplants that can be airlifted and assembled in remote places. The units would be prefabricated in interchangeable modules.

Profile of a New Process

WE KNOW that explosive forming will:

- Increase the elongation of a carbon steel to 70 per cent. (The normal limit is 42 per cent.)
- Harden aluminum 95 per cent without changing its size.
- Eliminate springback in forming even the toughest metals.
- Shape refractory metals that can't be handled any other way.

The question is: Why?

To get some answers, STEEL invited several authorities to give us their opinions. Here is the gist of what they say (their complete comments follow):

1. Under explosive pressures, metals are formed plastically. They do not become fluid. They move through the elastic into the plastic range and take permanent set in a few millionths of a second. The plastic state is different from that observed in conventional forming.
2. An explosive force distributes itself far more evenly than the forces in a conventional forming die. You get even penetration into every crack and crevice.
3. Under certain conditions, refractory metals are easier to form than comparatively ductile ones. To paraphrase one of our authorities: Such metals have greater ability to hold together when different velocities in various places work against each other trying to tear the metal apart.
4. The hardness of metals formed explosively doesn't correlate with the hardness of conventionally formed metals because you are measuring different phenomena.
5. It is possible that an explosion affects the atomic force relationship in rearranging crystal slip planes. Atoms slip, break, and heal almost instantly.

DR. JOHN S. RINEHART, Colorado School of Mines, Golden, Colo., is establishing a graduate research center for the investigation of explosions, fragmentation, and impact dynamics. His experience with explosives includes posts at Naval Ordnance Test Station, China Lake, Calif., Cambridge University, England, and assistant director, Smithsonian Astrophysical Laboratory, Cambridge, Mass.

Why Explosive Forming Works

Three authorities give you an intimate look at what is known about the mighty forces at work when metals are formed by this fascinating new method

By Dr. John S. Rinehart

It has been difficult to assess the true value of explosive forming. Published statements are enough to excite the most conservative. But the deeper facts ought to be considered, too.

• **The Facts**—Explosives generate a short lived, high pressure pulse. Pressures may be 4 million psi. As explosive and metal are separated, pressure decreases, duration increases. An explosive in intimate contact instantly generates exceedingly high stresses just inside the metal, setting up a transient stress disturbance. It goes through the metal, producing fractures, plastic flow, and other deformations. Such situations have been extensively explained, and the fundamentals are understood.

• **Effects of Distance**—It is vastly different when the explosive is away from the metal. If the space is air, peak pressure will be greatly reduced. Liquids are much better. Water, for example, helps round off the pressure pulse. While it reduces peak pressure, it prolongs the action.

Abrupt pressure rise followed by a rapid decline causes fracturing (contact explosions). A gradual pressure rise and decay are better. Pressures in an explosive-water-metal

VASIL PHILIPCHUK manages special projects at National Northern Corp., a subsidiary of American Potash & Chemical Corp., West Hanover, Mass. His background includes ten years at the Navy Proving Grounds, Bethesda, Md., where he tested explosives, rockets, and armor plate. One of his projects proved prophetic: The study of underwater explosion effects on metal structures

JOHN PEARSON heads the War Research Branch of the Naval Ordnance Test Station, China Lake, Calif. He has studied explosives and projectile loads since 1950, has written some 30 technical papers, and has coauthored a book *(Behavior of Metals under Impulsive Loads)*. He holds several Navy patents on ordnance items, and is a consultant to the Air Force on explosive forming

system are relatively low (at most, only a few hundred thousand psi). Duration is in thousandths rather than the millionths of seconds of closely coupled metal-explosive systems.

• **Tooling Effects**—In conventional methods, stress distribution is exceedingly complex. There are many opportunities for high stress concentrations.

An explosion in a liquid distributes itself more uniformly, penetrating evenly into every crack, crevice, and corner. It's as though you had a well-lubricated die continuously and instantaneously conforming to the metal during forming.

• **Affects Ductility**—As a rule, metals are less ductile when deformed rapidly. Just like tar, it will stretch a lot when pulled slowly but will fracture when struck sharply. A few metals (notably the high manganese and high nickel steels and certain aluminum alloys) show equal ductility at high and low strain rates. Copper and certain nickel-steel alloys get more ductile when stretched rapidly.

Few tests have been run to determine the effect of strain rate on ductility. Fortunately, we can draw many analogies between low temperatures and high rates of strain.

• **Inside Behavior** — None of the present applications turns the metal to a fluid. Metal will seem to be much stronger (sometimes 70 per cent) at high rates. That is because plastic flow is inhibited.

Critical impact velocity is quite important. One way to look at it: It is the ability of a metal to hold together when different velocities in various places work against each other. Mild annealed steel has the lowest critical impact velocity. Hadfield steel has the highest and is easiest to form.

Plastic flow under rapid loading can differ from that of static deformation. That explains differences in work hardening. Many times measurements don't jibe because you are measuring different phenomena.

• **What Is Needed**—The technical knowhow from which this new industry must draw is meager. Much more fundamental investigation must be supported. Those in process development must understand more clearly the dynamics of the forming process during all its stages.

Standard tests must be devised to evaluate the formability of raw materials.

We need a handbook which can

be used easily by design engineers.

The great potential of metal forming by explosive charge has just been tapped.

By Vasil Philipchuk

Where normal processes fail, high-rate forming by explosives can often do the job.

Explosives experts are quite familiar with metal fracturing. It occurs when loading rates are excessive. But there is a load-rate area which will deform metal without fracturing.

Since industry learned that high hydrostatic pressure multiplied plastic deformation possible before fracture, many have been vigorously trying to determine capabilities. National Northern has been active in the search since 1955.

• **The Plastic Theory**—Stretching or drawing metal involves rapid movement through the elastic into the plastic range, producing a permanent set within millionths of a second. Under high rate stress-strain, plasticity differs from that of conventional conditions.

No one knows completely how metal acts under high stress-strain rates, so we can only theorize.

Atoms in a crystal are spaced and held by cohesive and repulsive forces. Those forces are disturbed and rearranged under a stress which produces strain.

The deformation is called slip and takes place along many planes in the crystal grain. Total deformation is the sum of innumerable small displacements along innumerable slip planes.

Slip interference, or braking, takes place when a grain boundary is encountered. Then adjustments of the atoms, or healing, takes place through the cohesive forces between the atoms.

We can theorize that, under high stress-strain rates, atoms go through a series of slip, brake, and heal events quite rapidly. Ultimate failure occurs when the healing or cohesive forces between the atoms of the metal are insufficent to cope with continued slipping. That happens when it is stressed too long. So, control the duration, and you prevent failure and locate a band of high stress-strain combinations which will do forming.

• **Outlines Differences**—The explosive method differs from the mechanical because the highest stress is applied instantaneously.

Study has been aimed at getting a relationship between conventional plasticity and that under high stress rates. We find that the ability of a material to be explosively formed is a function of elongation. Other factors: Metal temperature, the medium used for force transmission, explosive, plus some constant for each metal (determined experimentally).

We also find that explosive forming produces much greater elongation. This will give you an idea of the relationship (1 is equal to conventional elongation):

Nickel	1.0
Stainless steel	1.1
Titanium	1.5
Plain carbon steels	2.3
Aluminum	2.5
Tool steels	2.0 plus
Magnesium	2.0 plus

By John Pearson

You ought not to expect only one explanation of why explosively formed metals behave the way they do. For one thing, explosive charges form, shape, extrude, compact, swage, and weld. An explanation for one doesn't necessarily hold for the others. Different factors affect explosives in intimate contact with the work and those separated by an air gap.

• **What We Know** — Under high strain rates, elastic limit, yield point, ultimate and fracture strength all increase over conventional values. Loading rates of only 200 fps increase ultimate strength about 50 per cent.

Compressive yield strength of some steels can increase 300 per cent.

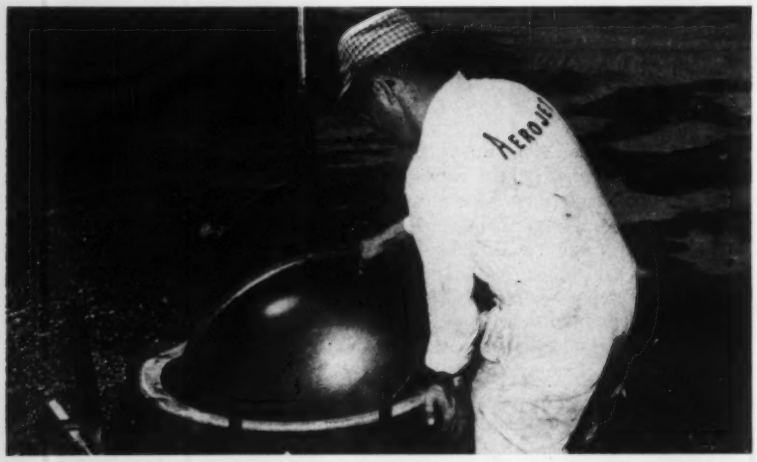
When tensile loads are added to hydrostatic pressure, ductility becomes practically unlimited, and fracture strength is increased several hundred times.

One explanation for high resistance to fracture under such loads: High pressure prevents the formation of flaws which would otherwise act as focal points for fractures.

Under explosive pressures, parts of a workpiece move fast enough to introduce similar effects at high strain rates. You try to capitalize on such behavior. (Much fracturing comes from stress wave interactions. With our present knowledge we can either prevent fracturing or use it to advantage.)

Two other points which govern behavior: The pressure-time distribution and the way parts of a work piece are moved.

• **Pressure-Time** — The pressure-time distribution is considerably important and is controlled by charge



Explosives punched out this bowl in a concrete-backed steel die at Aerojet-General Corp., a subsidiary of General Tire & Rubber Co., Azusa, Calif. The firm recently entered the field, hoping to find a better way to form missile components

size and shape, standoff distance, and various buffer materials. While it depends on each operation, here are a few general statements: The peak pressure should be reached rather quickly. For open die, sheet metal forming, transmitted pressure need be only in the lower range.

Higher pressures are required when the explosive is in contact with the work. In open die forming, a fairly long pulse is good even though it may decrease peak pressure.

In contact operations, too rapid load release may have some bad effects. A material can take a lot of elastic energy. The material, normally released while the load is decreasing, can overextend during the recovery, and distort or fracture.

• **Effects on Metals**—An explosive detonated near a part, displaces the elements two ways: First, generated pressures push on the object. Second, blast energy introduces particle motion (called a stress pulse).

With an air gap between metal and explosive, part motion is almost entirely by pushing. With a buffer or contact explosives, particle motion is more important. Velocities can range from a few feet per second for standoff charges to several thousand for contact methods.

Stress pulse size and particle velocity can be accurately calculated. They can also be calculated for unusual cases where a sizable shear wave is induced.

Many successful open die, sheet metal forming operations involve inert buffers which increase the load-release time (pulse duration). They also probably transmit energy into the workpiece inducing particle motion.

• **Effect on Grain Structure** — When discussing work hardening, you must carefully define the operation and the meaning of changes in grain structure. I have seldom found transitions in lattice structure. Under most conditions, they do not occur. Plastic deformation in microstructure (grain distortions, Neumann bands, slip lines) is frequently encountered.

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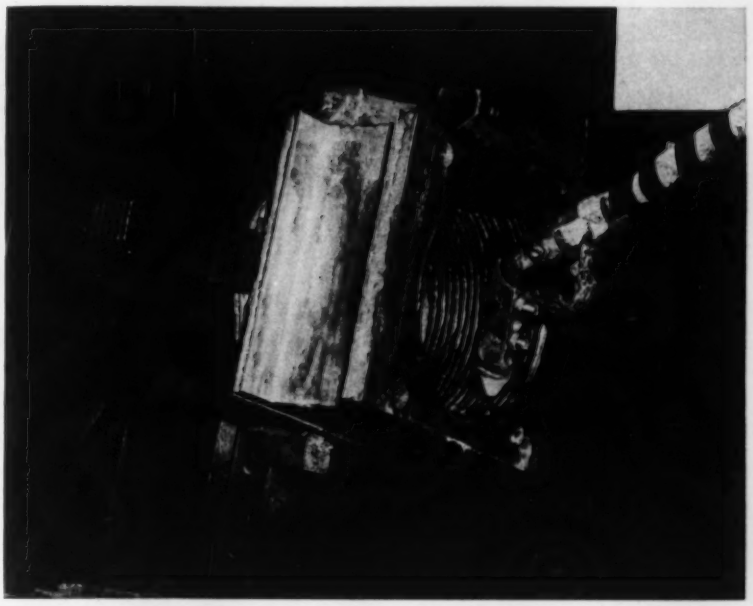


Welding nozzle, depositing a spiral of metal, builds up bore of worn journal box

Maintenance Costs Cut With Machine Welding

Buildup process for worn parts uses lathe and electric welder. It leaves a more uniform deposit, takes less time than hand welding; cuts machining time in half

IF YOU'RE looking for ways to save time and cut costs, you may find good hunting in your maintenance department.

In the maintenance shop at Weirton Steel Co., Weirton, W. Va., submerged arcwelding is used to build up the inside of worn journal boxes for diesel locomotives.

The box is chucked in the faceplate of a large engine lathe; the nozzle extension of a Lincoln Electric Squirt welder deposits metal on the inner surface as the part turns.

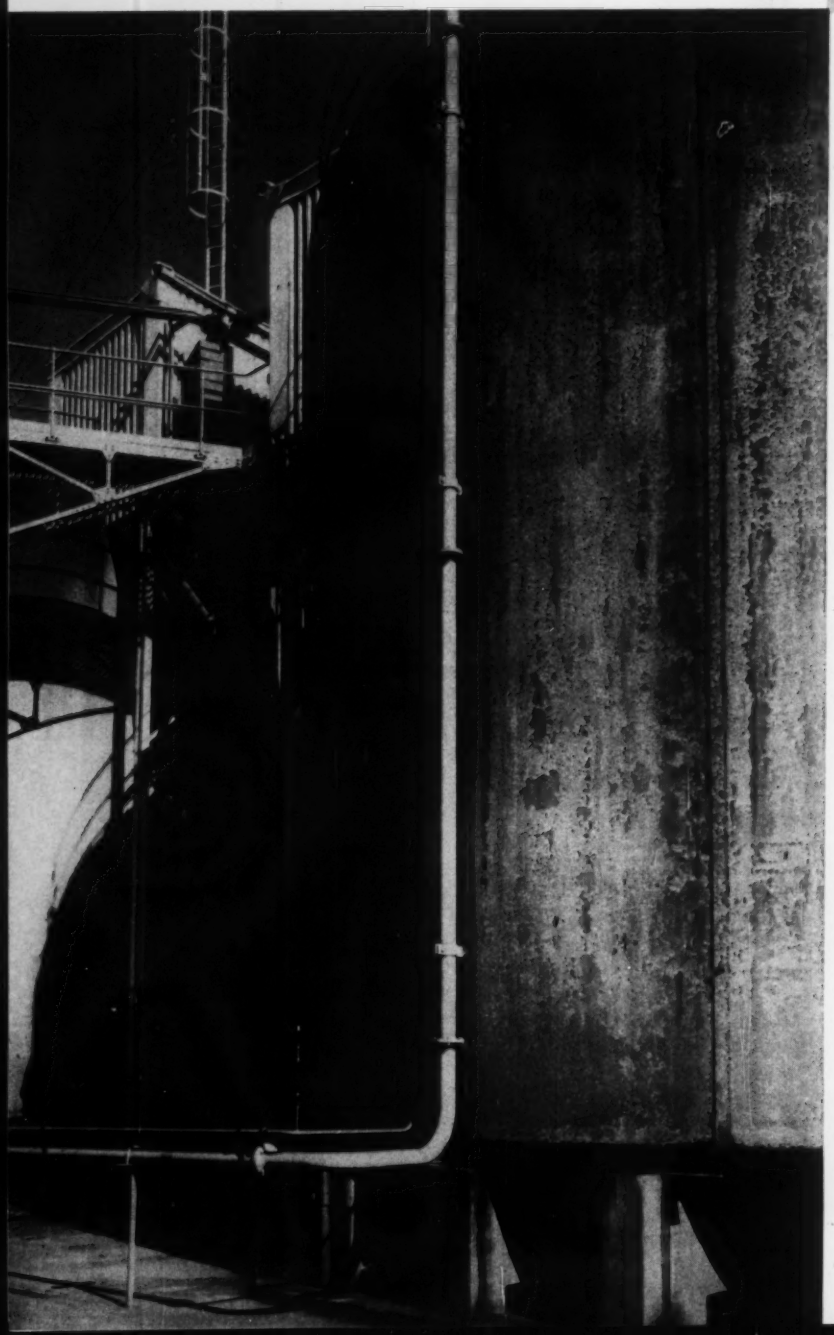
• **Spiral Weld**—The welding head, using 5/64-in., mild steel electrode wire and supported by a screw-fed carriage, produces a spiral buildup in either single or multiple layers. The smooth, evenly spaced deposit is made in only one-sixth the time required for manual welding. Machining each box to specified internal diameter takes only half as long as boxes built up by other processes.

A cup of neutral granular flux is poured into the box before the arc is started; as the part turns, flux flows to the bottom, enveloping the arc. Flux is added only twice during the welding operation.

A steel plate, placed over the outer face of the journal box, has an opening to accommodate the welding nozzle. It extends over the bore to hold the flux and permit buildup to the edges.

How To Prevent Underfilm Corrosion

Premature coating failures like that in the photo below can be prevented by a new, cold phosphating process that passivates the surface and makes it nonconductive



TODAY's paints and protective coatings should be giving several times their normal service life.

They fail long before they have reached their potential because corrosion attacks beneath the film, rather than on the exposed surface. Even though the paint film is unbroken, rust forms on the substrate and pushes the coating away from the metal.

The photo at left is a good example. A topnotch paint job failed in less than nine months because all mill scale hadn't been removed. With proper surface preparation, it would have lasted for years.

• **Rust Starts Early**—Most corrosion engineers agree that most underfilm corrosion starts before the coating is applied, says Henry W. Adams, corrosion consultant, Wilmington, Del. An analysis of standard cleaning and treating methods shows how this happens.

Proper sandblasting cleans steel to even, white metal. All dirt, mill scale, and corrosion products are removed. But the method can't make steel invulnerable to moisture or render it nonconductive.

Although the steel is primed the same day it's cleaned, the damage is done by the time it's blasted, dusted, and the prime coat applied. Moisture in the air has started a reaction that's likely to continue and grow beneath the paint film.

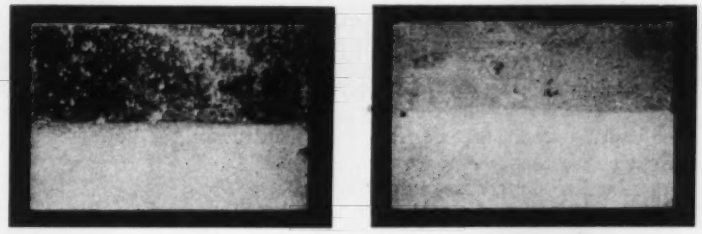
• **Mechanical Means Ineffective**—Wire brushing is another standby. It is effective for removing dirt and light rust. It can't get at heavy layers of tightly adhering rust, nor

Effect of Treating Rusted Steel Plates

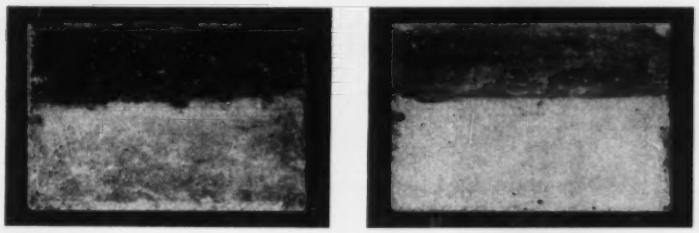
Wire Brushed
Two Coats of Paint

Wire Brushed
One Coat of Grayguard 7
Two Coats of Paint

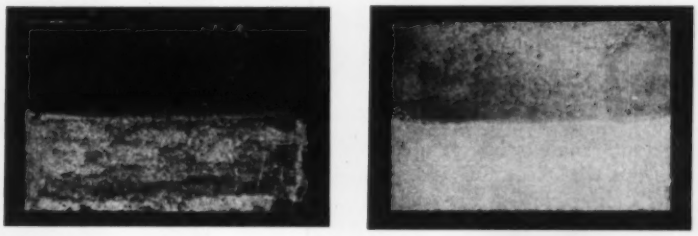
Top half of each panel was stripped to show underfilm effects



800 hour exposure in 95 per cent relative humidity at 120° F



800 hours of complete immersion in salt water



800 hour exposure to fine sea water spray at 80° F

will it knock off heavy mill scale. When done with power tools, brushing burnishes the surface and reduces adhesion of paints or coatings, says Mr. Adams.

Flame cleaning in the field has an advantage over sandblasting and wire brushing because it provides a dehydrated surface for the primer and promotes longer coating life. It takes off loose scale and rust, but it does not remove tightly adhering mill scale.

Also, it doesn't provide the two conditions necessary to prevent underfilm rusting—a nonconductive surface and metal that's invulnerable to moisture.

• **It Can Be Done**—Underfilm corrosion can be prevented. Correct surface preparation is the key. Thorough cleaning is essential, but three other conditions are equally vital.

After cleaning, the metal should be passivated (treated so it won't react with moisture in the air). Then, because galvanic currents and electrolytic action are major sources of corrosion, the surface must be made nonconductive. Finally, proper priming will assure a tight, lasting bond for the finish.

• **One Way To Do It**—The hot immersion process is one way to obtain the proper conditions. Steel plate is descaled by dipping it in hot acid. Then it is rinsed in hot water, dipped in a hot phosphating solution, and the prime coat applied immediately.

The method is strictly a shop operation and used almost entirely for treating steel plates. Some plates for tanks (but little structural steel) are treated that way.

• **New Method**—Mr. Adams says a method developed in England has considerably more latitude—it can be used in the field, on site, or in the shop. Called the Grayguard system, it was introduced in this country by Atlantic Laboratories of Delaware Inc., Wilmington, Del. It is being used on tanks, structures, and piping, as well as for pretreating manufactured products.

Basically, the system is a cold phosphating process that's applied with a brush. It differs from other cold phosphating processes in that it does not form a heavy, powdery deposit that has to be washed off before painting, nor does it require a long maturity period.

• **It Dries Quickly** — The conditioner-primer (Grayguard 7) usually dries in less than an hour. Then it can be painted. If immediate painting is not practical, the surface can be left unpainted for as long as two weeks without harm.

The liquid Grayguard material reacts with steel to form a complex metallic phosphate coating. It covers the treated surface with a tough plastic film which provides further protection and serves as a bonding base for the final finish.

Equally important, it reacts with surface oxides as well as the metal. With all oxides removed, the surface passivated, and a nonconductive layer established, there's no way for underfilm corrosion to get started—even if the final paint job should crack or be damaged.

• **Useful with Sandblasting**—The

method is especially effective as an adjunct to sandblasting, states Mr. Adams. No dusting is necessary. It can be applied immediately after a washdown, without waiting for the surface to dry. Because it is an emulsion base coating, Grayguard 7 stays in the water phase long enough to react with oxides formed during washdown. In a variety of jobs, the process has shown that it will extend coating life even when applied over light rust.

In most cases, the material can be applied for about 5 cents per square foot (including labor and materials). The biggest savings result from its ability to fill the final requirement for long coating life—it serves as the prime coat besides being a pretreatment.

Most coatings and paints adhere tightly to the treated surface, without using a separate prime coat. Special primers may be applied; they also bond well to the treated surface.

• **Two Material System**—Two companion materials enhance the value of the method, both for in-plant and field use. They are chemical descalers, called Grayguard Descaler No. 2 and No. 4. They take the place of mechanical cleaning in shop areas where dust or grit would harm equipment or interfere with production. In the field, they do a fast and thorough cleaning job where mechanical or flame-cleaning equipment isn't available.

Descaler No. 2 is for cleaning badly corroded metal which has tight, heavy rust, or rust scale but no mill scale. A brush applied jelly, it cleans down to bare, bright metal in 45 minutes to a maximum of 4 hours for extremely thick rust.

Descaler No. 4, also a jellylike brushable material, is for steel which has mill scale. Most scale is dissolved within a few hours; extra heavy scale may take an entire day.

In both cases, descaling must be followed by washdown, then application of Grayguard 7. Cost of the complete cleaning and pretreatment system (including labor and material) is usually under 20 cents per square foot.

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Machine Contours IDs

Here's another process that substitutes forming for rough machining to generate a shape. Cylinders are cold formed to add a closely controlled, contoured inside diameter

MACHINE tool builders, long in a mood to sponsor a "let's mass produce chips" week, are on the contrary leading the race to come up with practical methods of chipless machining.

The payoff for metalworking will come in the reduction (some say "elimination") of rough machining. The theory: In most cases it will be cheaper to start production with a part that is shaped to approximate the finished part. Result: Castings, forgings, rolled and extruded shapes are in for continuing refinements.

• **Sample** — Newest in the list of builder-developed techniques for chipless machining is the Intraform, turned out by Cincinnati Milling Machine Co., Cincinnati. Its product: Formed complex ID profiles on cylindrical parts.

Here's how it works:

Tubing is slipped over a shaped mandrel. The end of the tube is inserted between four forming dies that pulsate rapidly while revolving around the workpiece OD. Metalworking's closest kin to the process is swaging.

Cams, mounted on the four dies, contact a series of free-wheeling rollers in the machine headstock. As the die cams pass from one roller to the next, the dies pulsate, squeezing the workpiece and forcing the metal on the ID to conform to the mandrel.

The workpiece is fed over the mandrel through the dies, exposing a new surface to the machine for forming. Since the workpiece feeds, but the mandrel does not, the mandrel can be relatively short and inexpensive.

Cincinnati reports use of Intraform machines to cold shape both nonferrous and ferrous alloys (workpieces range from about $\frac{1}{8}$ to 5 in. OD). Workpieces can be premachined blanks, tubing, castings, forgings, extrusions, or powdered metal parts.

• **Jobs**—The machine has already accomplished some production jobs. For example, it has turned out 30-06 rifle barrels at 25 an hour, forming the chamber and the rifling. Barrels of AISI 4140 were drilled and reamed to a 32 microinch finish before forming. After the rifling was formed, the bore had a finish averaging 7 to 8 microinches.

Since the process generates a shape without converting metal into chips, it may help you get by with less material. A high speed steel pin (formed without a mandrel so only the OD is worked) used to be machined from $8\frac{1}{2}$-in. long blanks. Intraforming squeezes the metal longitudinally to get length, so it starts with $4\frac{7}{8}$-in. blanks. This reduction saves $202.65 in materials for every 700 part lot.

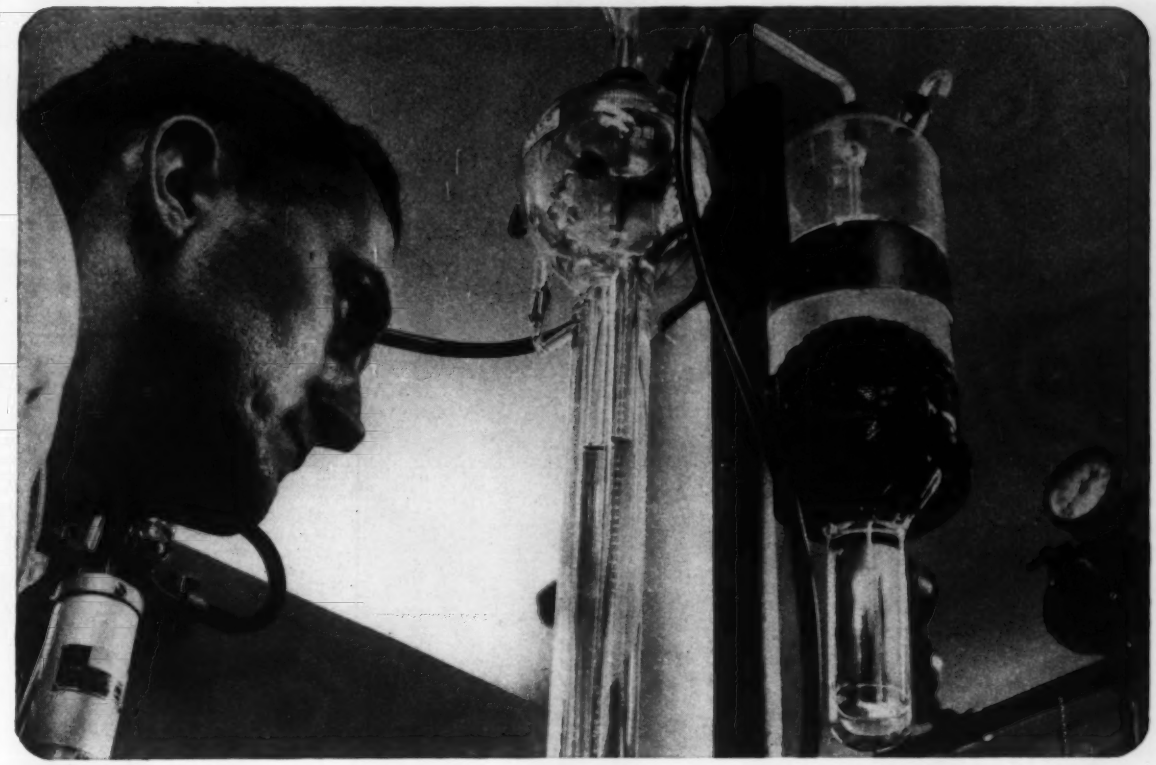
Faster Electromachining

Next week's issue of STEEL will report on a process that adapts the electroarc cutting process to grinding. Developed by Anocut Engineering Co., Chicago, the process has been tailored for high speed machining on aluminum and stainless steel honeycomb.

In tests on stainless core with $\frac{1}{4}$-in. cells made up of $1\frac{1}{2}$-in. foil, the process has removed materials to a depth of 0.060 in. at a rate of 30 ft a minute. Higher rates were obtained with shallower cuts.

Key to the process is a metallic wheel that has a series of grooves or serrations on its periphery. The wheel is rotated to provide about 2500 contacts a second, so that many arcs are struck and extinguished.

***Experience**—the added alloy in **Allegheny Ludlum** tool steels*



QUICK, FAST TESTING for carbon content is done not once or twice but 8 times per melt in A-L's Chem Lab with this direct reading Leco carbon determinator.

Carbon content checked 8 times during melt to guarantee A-L tool steel hardenability

Lab tests for carbon eliminate your guesswork; provide high hardness, uniform hardenability, reproducible tool performance.

Because carbon has the greatest influence on hardenability, Allegheny Ludlum watches it carefully during the melt. Testing a specimen for carbon takes only a few minutes. Therefore, A-L checks for carbon content 8 times during the melt, and makes the necessary adjustments to insure accurate control of carbon. This control means Allegheny Ludlum can hold carbon content to a closer range than most customers specify.

Carbon control at Allegheny Ludlum assures you of precise response to heat treating. This control in the melt brings you predictable, *high hardness, uniform hardenability* and *reproducible tool performance.*

This is just one of the many things A-L does to insure high quality. Here are some others: close control over forging techniques, rigid temperature-time programming, careful testing of billets prior to processing to insure good surface and sound interior, control over annealing to give you the right hardness for your exact machining operation, thorough metallurgical testing to insure top tool steel quality and meeting of your specifications.

Allegheny Ludlum stocks a complete line of tool steel sizes and grades. Call your nearest A-L representative; you'll get quick service and counsel on such problems as heat treating, machining, grade selection, etc. Or write for A-L's publication list which gives full data on the more than 125 technical publications offered. They'll make your job easier.

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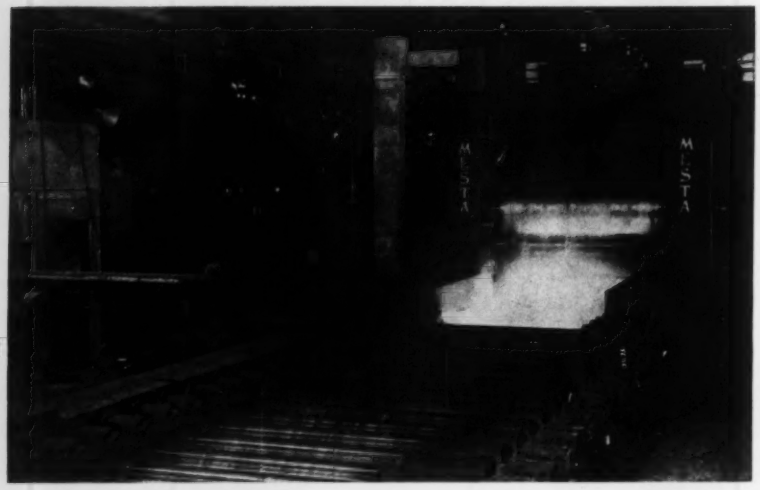
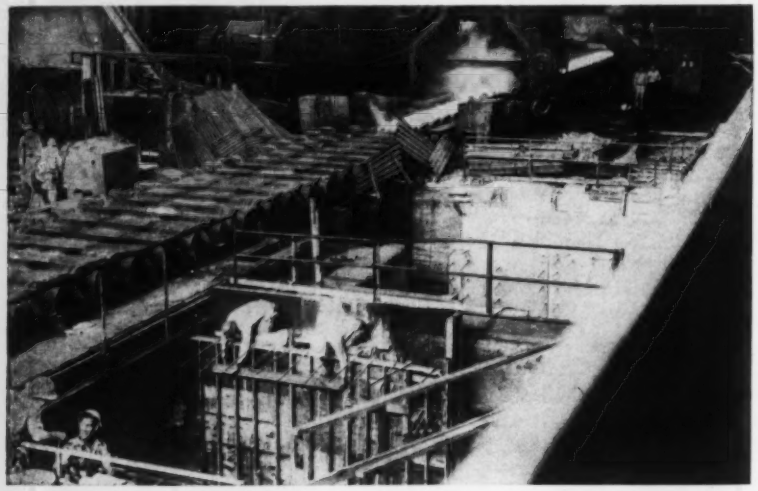
Tool Steel warehouse stocks throughout the country... Check the yellow pages

every grade of tool steel... every help in using it



New mill was rolling after only 30 days' downtime . . .



. . . Old mill produced plates as construction went on

Kaiser Controls Downtime In Plate Mill Changeover

YOU CAN shorten downtime when replacing heavy equipment or installing a new mill by operating the old machinery as long as possible while installing the new.

Kaiser Engineers, a division of Henry J. Kaiser Co., used the technique when it replaced a 3 high, 110 in. plate mill with a 4 high, 148 in. mill at the Fontana, Calif., plant of Kaiser Steel Corp.

Replacement took nine months, but operation of the old mill while preparations were made for installing the new one held major shutdown time to 30 days.

The changeover, costing $10 million, is part of a $214 million expansion program at Kaiser Steel, which is almost finished. The mill now turns out steel plate up to 126 in. wide and 720 in. long.

• **Careful Preparation**—To avoid a long shutdown, Kaiser personnel outlined the changeover carefully and did as much of the work as they could before the old mill was idled.

A new mill lubrication system was installed. The oil cellar runs parallel to the mill line on the operating side, then passes under the roll line. To avoid interrupting production, the runout table was supported by structural steel, and temporary wiring was installed to replace embedded feeders and control wiring.

As hot steel passed overhead, demolition work was done; prefabricated forms were set in place; reinforcing bars and foundation bolts were installed; and concrete was poured.

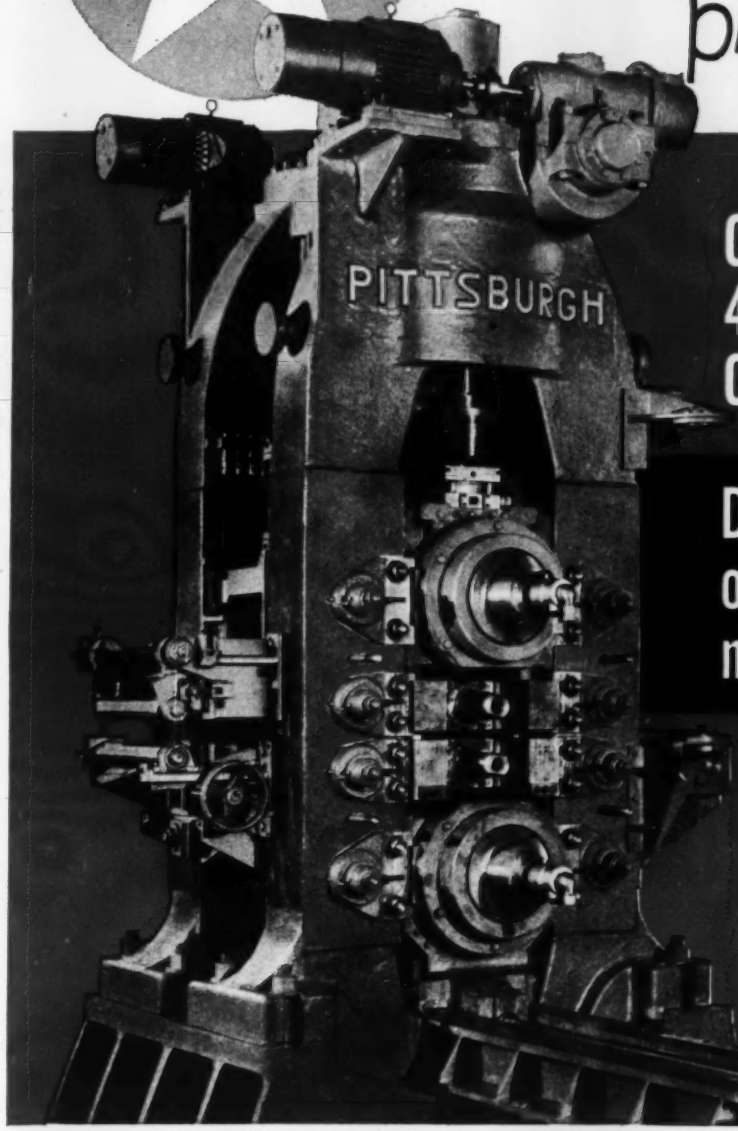
The 7000 hp mill motor had to be moved to a location that was crossed by control conduit for existing units. With the old mill in operation, workmen uncovered each conduit, drilled it, and traced it to the proper panel or gear by filling it with compressed air. When all circuits were identified for replacement or abandonment, the area was excavated and a new foundation was poured for the motor.

• **Downtime Exploited** — About 30 per cent of the changeover was done during the 30 day shutdown. Most of the equipment had to be removed at that time because new or reconditioned machinery was to be installed where the old had been.

Much of the mill machinery was relocated or rebuilt. A new crank, top knife head, and pitmans were installed on the dividing shear. The side trimming shear was rebuilt with a new driveshaft on a wider base. A modified transfer, with entry and delivery tables, was set in place, and new centering side guides were installed ahead of the end shear.

Although electrical conduit had been placed and wires installed before the old mill was shut down, several connections had to be made and tested during the 30 days' downtime. Mill motor controls were modified to meet the requirements of 4 high operation.

PITTSBURGH presents—



Combination 4 High /2 High Cold Mill...

Does the work of two separate mills

"Precision" and "Versatility" are the words that best describe the new combination 2 High/4 High Cold Mill designed and built by PITTSBURGH to secure precision gauge, temper and finish for the ferrous and non-ferrous industries. As a 4 High Mill, it is used for cold reducing; as a 2 High Mill, it is used to acquire the desired temper and finish. Several desirable design features are incorporated to keep roll change time to a minimum. Low initial cost and economical operation are attractive plus values.

Heavy Machining Facilities

Our plant is equipped with a superior complement of well diversified machine tools that are available on a continuing basis for economical machining of heavy castings or the manufacture of auxiliary rolling mill equipment, such as heavy mill tables, furnace pushers, slab depilers, downcoilers, ingot buggies, slab transfers, etc.

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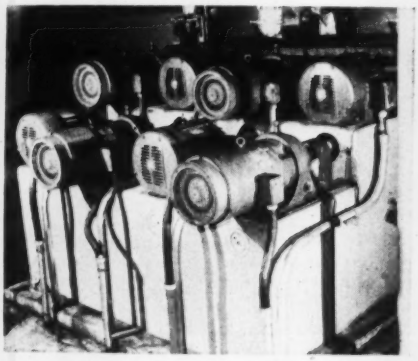
PLANT AT GLASSPORT, PENNSYLVANIA

SPACE-SAVING General Electric continuous annealing line helps reduce annealing time, improves strip quality.

ACCURATE SYSTEM CONTROL is provided by this centralized, space-saving General Electric DC adjustable voltage control panel lineup.

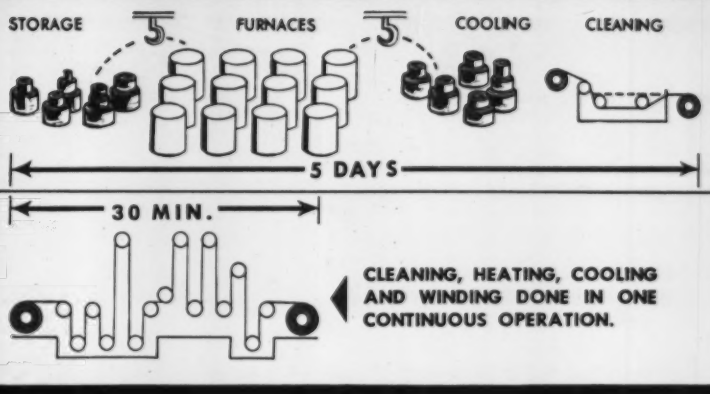
ABUNDANT POWER for operating furnace rolls is supplied by these G-E motor-generator sets (left). Panels (right) control all 440 volt AC power distribution.

POWER-PACKED lineup of new General Electric gear-motors used on cleaning and preparation section of annealing line are rated 7½ hp, 184 rpm.



OLD
BATCH
ANNEALING

NEW
GENERAL ELECTRIC
CONTINUOUS PROCESS
ANNEALING



GENERAL ELECTRIC HELPS
YOUNGSTOWN SHEET & TUBE

Reduce Annealing Time from 5 days to 30 minutes

A new G-E continuous process annealing line recently installed at Youngstown Sheet and Tube's Indiana Harbor tin mill, East Chicago, Ind., has demonstrated its economy and efficiency in only a few weeks of "on-the-line" operation.

According to Youngstown engineers, "The line not only increases productive capacity, but does it in about a third less space, and a lot faster —too." Generally, the line has improved operation efficiency by as much as 100 per cent, and cut annealing time from 5 days to 30 minutes over one of the batch annealing installations previously used.

Here's how G-E continuous annealing benefited Youngstown:

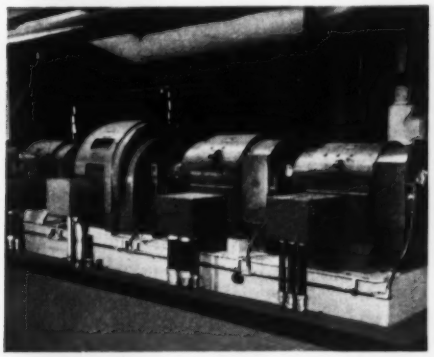
1. **Greater uniformity with continuous anneal**—every part of coil is exposed to the same annealing conditions.
2. **Higher temperatures uniformly and easily obtained**—permit considerable savings because equivalent strength and stiffness can be obtained with thinner gage steel.
3. **Superior resistance to corrosion of the base metal is obtained**—results in some lengthening of the average shelf life of canned products.
4. **Time is saved**—continuous process reduces material handling.
5. **Space saving**—floor space is reduced by at least a third.

In addition, G-E continuous process annealing lines contain the latest developments from G-E product and research laboratories. Such product progress, as indicated by newly applied G-E D-C Kinamatic* gear-motors on Youngstown's annealing line, is immediately passed on to improve complete systems.

Get complete information on how electrical systems for continuous annealing line can benefit your operation from your nearest G-E Apparatus Sales Office. Ask for bulletin GEA-6017A, Electrical Systems for Continuous Metal Processing. General Electric Co., Section 659-124, Schenectady, N. Y.

** Reg. trade-mark of General Electric Co.*

MASTER MOTOR-GENERATOR set with General Electric motor rated at 700 hp, 1200 rpm, 2300 volts, drives four G-E annealing line generators.



Engineered Electrical Systems for the Steel Mill Industry

GENERAL ELECTRIC

After a 10 minute cleaning cycle, doors open and the work conveyor reverses itself and discharges the load of castings into an oscillating conveyor

Automated Blast Cleaning Pares Labor Costs 50%

Application for gray iron castings saves firm $15,000 a year in direct labor costs alone. Three men now handle jobs that used to require crew of six

YOU may be able to make dramatic reductions in your labor costs by automating your blast cleaning operations.

Case History: The approach brought savings of 50 per cent at Master Electric Co., a division of Reliance Electric & Engineering Co., Dayton, Ohio. Six men were required to handle gating and barrel loading in the cleaning of gray iron castings. Three men now handle the barrels, gating, and stacking. Savings in direct manpower alone come to $300 a week or $15,000 a year.

• **Operator Effort Reduced**—In addition to chopping handling and production time in half for each ton of work produced, operator effort is reduced to a minimum. A push-button panel permits convenient control of the work loader, blasting, and tumbling cycle, plus abrasive conditioning.

Master Electric cleans about 33 tons of castings every day in two, 12 ft Rotoblast barrels (made by Pangborn Corp., Hagerstown, Md.). Typical parts: Electric motor end bells, motor frames, bearing housings, and gear cases.

• **The Cycle**—The load is automatically charged into the machine, and the loader returns to position —the barrel door automatically closes and blast action begins. After a 10 minute cycle, the blast action stops; doors open; the work conveyor reverses and discharges the load into an oscillating conveyor. The load is moved to a special batch transport car which carries it to later inspection and processing stations.

During the barrel operation, the unit's cleaning and reclaiming system removes scale and debris from the abrasive.

New Fastener Design Saves 50% on Unit Cost

IF YOU'RE using special fasteners in an assembly, check the design out with your fastener supplier. He may be able to save you money.

Norge Div., Borg-Warner Corp., Chicago, saved 50 per cent on the cost of a refrigerator shelf hanger unit with the help of Midland Screw Corp., Chicago.

Norge had been using a one-piece bolt with a grooved head. Midland designed a less costly two-piece part consisting of a standard bolt and a special free moving washer.

Since Norge wanted a one-piece unit, Midland secured the washer to the bolt by placing it on the blank shank and then rolling the thread up to the washer. Mounting the hanger bolt assembly onto the side panel of the refrigerator gave it the firmness needed.

The saving in cost resulted from eliminating the special cutting or shaving operation on the original part.

"They use this Super Alloy tubing in missiles, rockets and jets

—so you know it can lick your heat and corrosion problems!"

*"It's made by Superior Tube in your choice of 16 different materials. Believe me, this tubing can take the severest conditions of heat, corrosion and oxidation. Has very high fatigue and creep strength even at temperatures over 1000°F."

If you have a temperature and corrosion problem that causes failure no matter what type of tubing you have tried, get your Superior distributor to order Super Alloy tubing for you—it is the tubing for virtually every critical application of this nature.

Super Alloy tubing offers the important properties mentioned above, plus the dependability and longer service life built into it by Superior skills and experience. We will put your tubing through many special examinations if you want us to—eddy current and ultrasonic, hydrostatic, and hot tensile tests, stress rupture tests, qualitative and quantitative analysis, and many others—for your complete assurance in its ability to perform as required.

Our continuing test program on Super Alloy tubing has amassed much useful information on mechanical properties. You will want to make a study of them and their potential for use in your applications. They are covered in our Bulletin 70. Send for copies. Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

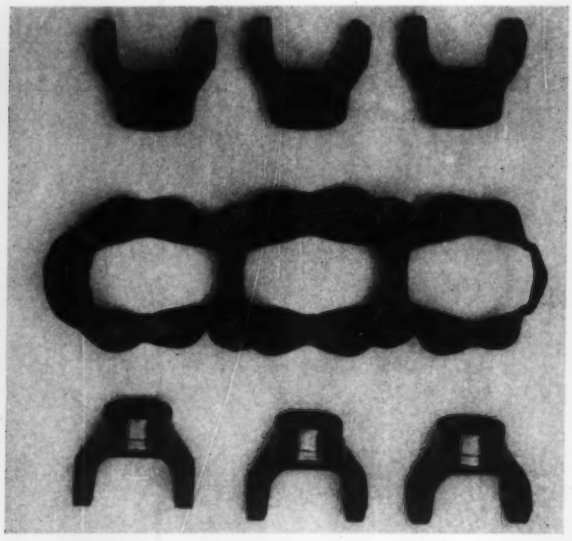
Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to 5/8 in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company • 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331



Operator feeds SAE 1151 billet to forging press. It forms three pieces from the one billet. (See at right.) Redesign of billet and automation reduced flash 10 per cent

Automated Forge Shop Saves GM 25%

Parts for passenger car drive trains roll out smoothly from a newly integrated production line that features conveyors co-ordinated with microswitches

AUTOMATIC hot forging saves GM's Saginaw Steering Gear Div. more than a third of its forging costs on propeller shaft assemblies. (They're used by Pontiac, Oldsmobile, Buick, and Cadillac.)

"When we started automatic forging, the hammer operators told us it couldn't be done. For a while we were almost willing to believe them," says Ellis Ivey, manager of Saginaw's No. 4 plant.

• **Answers To Success**—Careful attention to lubrication is one of the reasons for the smoothness of the operation. So far, the presses have turned out well over a million parts. Another reason stems from the interlocking of all machines in each line with microswitches. The technique permits an even flow of material through the entire cycle.

• **Old Way**—The forgings are weld yokes, universal joint spiders, externally splined slip yokes, and internally splined couplings. They used to be purchased.

In most cases, drop forging took seven blows for each forming operation. Automatic lines cut the number of blows to two—plus a reducing roll operation. Flashing has been reduced, and the number of operators needed has been cut in half.

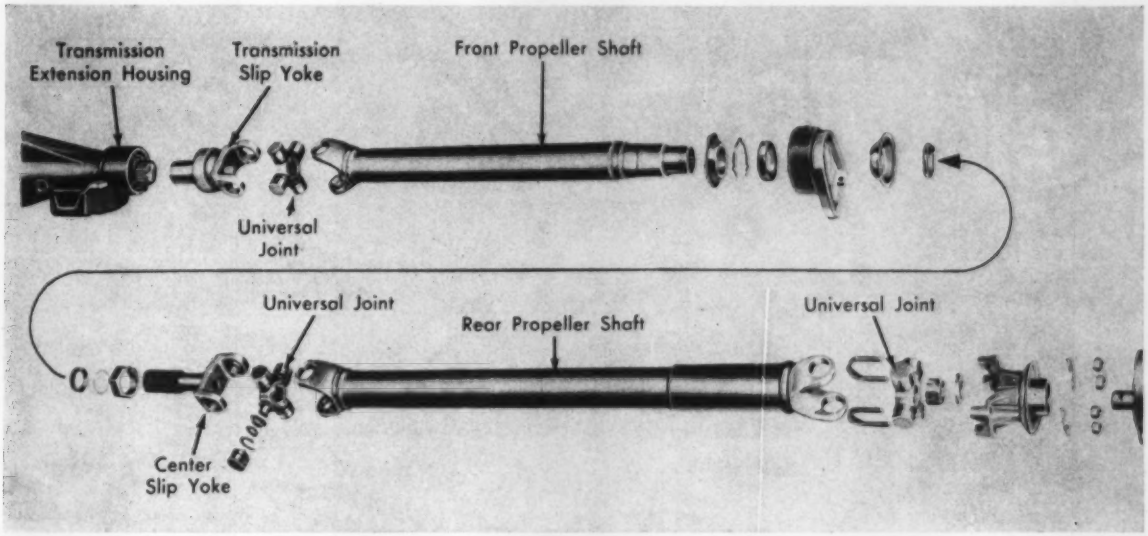
Each part is made on a separate line; but each line is similar. So the weld yoke line described here is typical.

• **New Way**—"We bring in our 15 ft bar stock in 10,000 lb bundles," explains Ben Mahank, senior tool engineer. They are placed on a loading ramp. Bars roll down and are automatically fed into a loader by hydraulic lifter pins. A shearing press cuts them into multiple blank lengths which drop onto an escalator leading to an induction heater.

The heater is a dual cycle type with a 60 cycle preheat of 1200 to 1300° F. Blanks then pass through a 3000 cycle heat which brings them to 2050 to 2250° F in about 12 seconds.

• **Preheat** — A photoelectric cell checks blanks coming from the heater for proper temperature. Those below 2050° F are shunted to one side and reheated. Those above 2250° F are scrapped because too much heat can weaken their structural analysis, says Mr. Mahank. The ones that pass inspection are hydraulically pushed through a roller that puts two dents in each blank so it looks like a three link sausage. Three parts are made from one blank.

• **Forming**—A swing arm picks up the blanks and automatically carries them to the left side of the press. A graphite-base lubricant is swabbed on the dies; the operator positions the blank for preforming, then moves it over for a finishing pass. The part is kicked out the right side of the press and moves on to a 125



Here's where the hot forged parts made by Saginaw Steering Gear are used. Weld yokes fit into each end of propeller shafts and are joined by welding

ton trim press. Conventional broaching, grinding, and polishing follow.

The division uses cast steel dies. Average life is about 30,000 parts. Cost is about half that of the wrought counterpart.

• **Exceptions**—Other parts are made similarly, although there are some differences in steel composition, press capacities, and lubricants.

Other exceptions: Spiders are made from a four section blank. Lubrication is soluble oil diluted 30:1 and automatically applied through manifolds.

• **Slip Yoke**—This part used to be a hammer and upset job which took six passes. It now is made on a 4 in., automatic feed upsetter. Only 5 in. of the bar is heated in the 60 cycle induction furnace. The blank is fed to an automatic loader and run through five passes, including trimming.

Dies are cooled and lubricated with a recirculating zinc naphthalene base material.

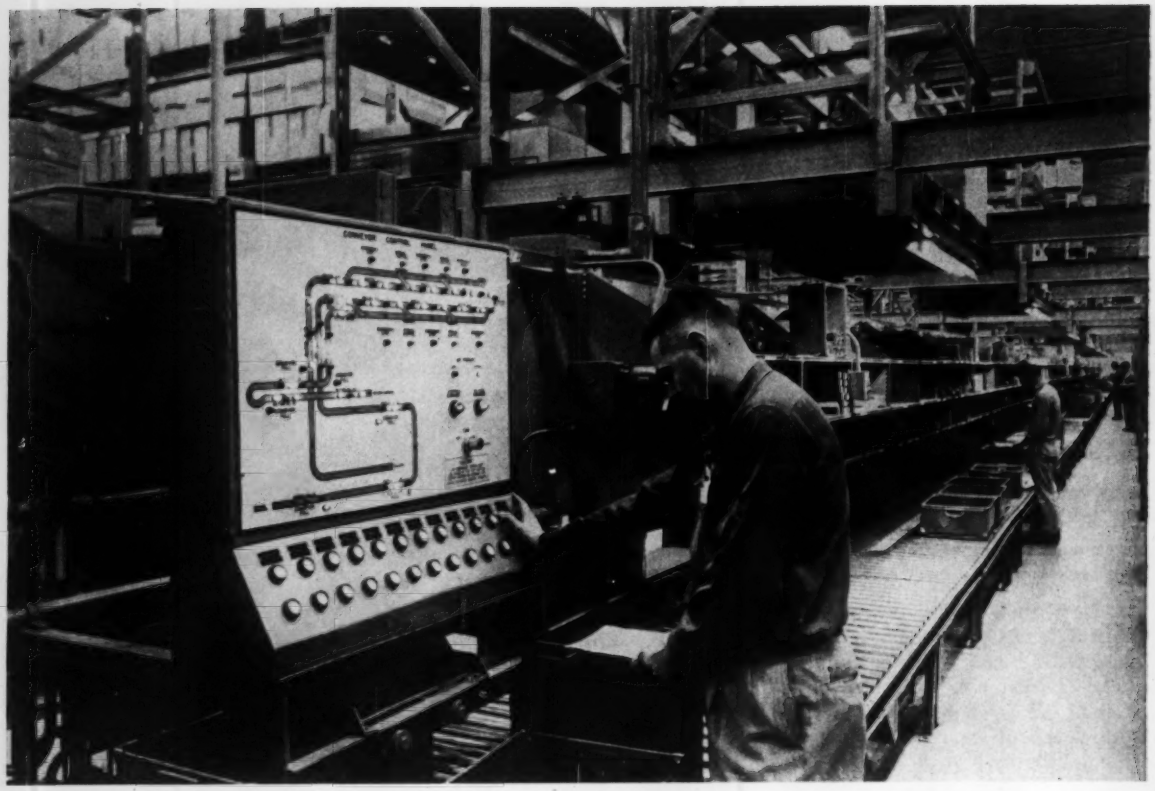
• **Slip Couplings**—Forming resembles weld yoke fabrication except that blanks coming from the heater automatically run through descaling rings which blast them with water at 1500 psi. They are automatically injected into the forging machine for the first pass and manually transferred for the next two operations.

This machine combines five forging operations in three. The first pass upsets and forward extrudes the blank. The second pass pierces and backward extrudes. The third pass pierces and punches out a slug. A colloidal graphite base lubricant is sprayed through punch holder manifolds at each side of the dies.

• **Eliminating Vibration**—Because of the proximity of induction furnaces and a battery of precision grinders, the division has mounted its 1300 and 1000 ton presses on floating I-beams which are beneath the floor. The I-beams are mounted on conventional damping springs. Says Mr. Mahank: "We can stand a quarter on edge next to the press when it's running. Floor vibration is virtually eliminated by the torsion damping system."

Saginaw Steering Gear's Automatic Hot Forging Lines

		Hourly Production Rate		Per Cent Flash		
Part	Blank	Gross	Net	Before	After	Approximate Savings
Weld Yoke	SAE 1151	900	630	32	22	10.24%
Spider	SAE 6115	1200	1080	40	25	11.27%
Slip Yoke	SAE 1141	750	450	1	0.5	44.69%
Slip Coupling	SAE 1151	550	358	0.5	0.5	38.78%
					Average Savings	26.24



Orders are reviewed, and tabs on the carrier are set to transfer it from live rollers to gravity roller conveyors at stations where items are to be picked up

Automated Conveyors Reduce Unit Costs

Dispatcher controls efficient material handling system from master panel; unnecessary walking is avoided in manufacturing and order filling operations

HERE'S A WAY to increase output with less manpower: Install conveyor equipment that automatically routes parts and end products through production and storage areas.

Those benefits are being realized at Western Electric Co.'s new Solon, Ohio, plant. Its co-ordinated, plantwide conveyor system was installed by Alvey-Ferguson Co., Cincinnati. Included are live roller, gravity roller, belt, roller flight, and truck-towing conveyors.

Of particular interest is the automatic system that carries parts and equipment, in aluminum trays, from one station to another in the order filling operation. Tabs on the tray carriers are preset so deliveries are made to desired stations along the conveyor route.

• **Controlled by Dispatcher**—The system is controlled from a master panel that includes a diagram of the conveyor route. Indicator lights show load conditions at stations in the system.

Orders are collected in hampers on special carriers. If more than one hamper, or tray, is required for an order, additional units are placed on the conveyor behind the carrier.

The dispatcher reviews each order and sets tabs on the carrier to indicate stations where ordered items are to be picked up.

As the carrier moves along the conveyor route, tabs strike limit switches at the appropriate stations. The carrier is deflected from the live roller line to gravity roller lines where ordered items are placed in the trays.

• **Returns to Powered Line**—After items have been collected, a slight push moves the carrier and hamper back to the live roller conveyor, and they go to the next station.

When orders are filled, articles are checked, then forwarded to the packing and shipping area in the same hampers. Carriers are returned to the dispatcher on a combination belt-roller conveyor line.

UNITED®

4-HIGH 6-STAND CONTINUOUS HOT STRIP MILL

UEFCO®

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

VAN HUFFEL

RECTANGULAR • ROUND • SQUARE

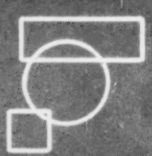
WELDED TUBING

THIS

BIG

Shown on this page, in white profile, are maximum and minimum sizes of Van Huffel rectangular, round and square welded tubing; in gauges from .028" to .250". For sizes and gauges in between, plus helpful engineering data, write for FREE 32 page Welded Tubing Handbook.

THIS SMALL



OR ANYWHERE IN BETWEEN

VAN HUFFEL TUBE CORPORATION • WARREN • OHIO

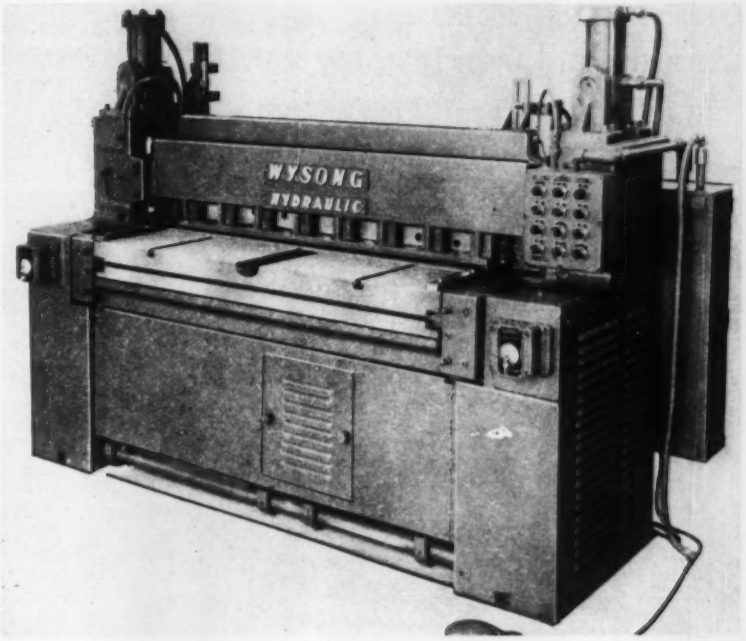
Shear Features Rapid Speed, Stroke Adjustments

HERE's a new machine for safe, accurate hydraulic shearing that handles metals, plastics, and composition sheets.

Adjustments that affect the accuracy and quality of the cut can be made in 1 minute or less. Ram speed is varied by turning a small knob to open or close a flow valve; the length of cut can be changed by a limit switch.

Holddown pressure can be varied by opening or closing a valve; the slope of the top blade can be changed from 0 to 3/8 in. per foot; pushbutton control enables the operator to raise the holddown for easy access to top blade bolts.

The Model HS-1052 has a 52 in. cutting length and a rated capacity of 10 gage mild steel. Other models in the line have cutting lengths of 6, 8, and 10 ft. For more information, *write* Wysong & Miles Co., 625 Fulton St., Greensboro, N. C.

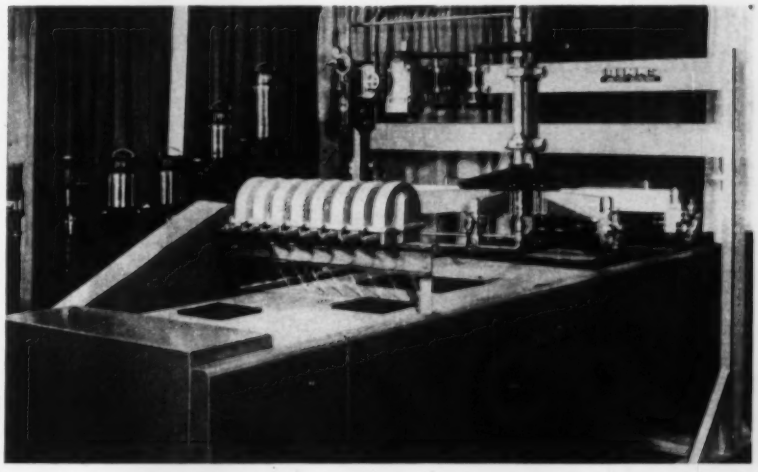


Spray Pattern Control Eliminates Paint Overspray

BECAUSE the right spray guns are energized at the right time to coat parts passing beneath them according to size, a control mechanism for automatic finishing equipment can save up to 45 per cent on coating materials, compared with systems without such controls.

The mechanism will fit rotary, vertical, and horizontal machines.

An electromechanical timer controls individual spray guns so the spray pattern follows the outline of the product. The unit actuates the guns only when there is a surface to be sprayed. It employs a mechanical "memory" system which is unaffected by surround-



ings. Maintenance is simplified.

The photograph shows eight of the Memory Timer units on an eight-arm Binks reciprocating spray machine.

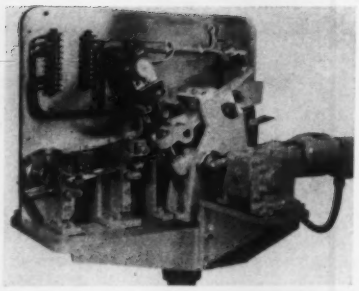
For more information, *write* Binks Mfg. Co., 3122 Carroll Ave., Chicago 12, Ill.

Gaging, Sorting Machine Checks Flanged Gears

THIS automatic gaging and sorting machine solves the problem of inspecting unwieldly gears with integral flanges which cannot be fed through conventional feed chutes.

The flanged gear rolls through the gage on a guide rail that supports the gear on the hub surface. Another guide rail behind the gear bears on the flange surface and keeps the gear upright until it is engaged by the master gear.

Gears of correct tooth size pass



into the gage exit and onto the production line. Gears that are oversize or undersize drop through trap doors in the exit chute.

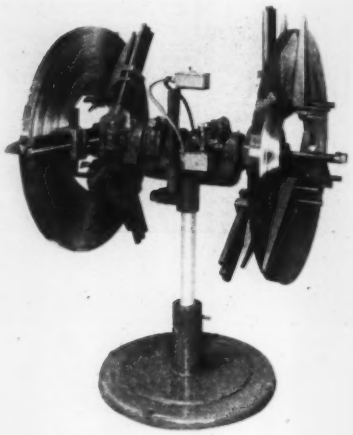
The pedestal-mounted unit will check gears produced by hobbing, shaping, or shaving operations. For more information, *write* National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich.

Reel Holds Two Coils

DEVELOPED for high speed press-room operation, this self-centering, double stock reel can be loaded with stock on one side while the other side is unwinding. Use of the reel increases the productivity of the equipment it is serving.

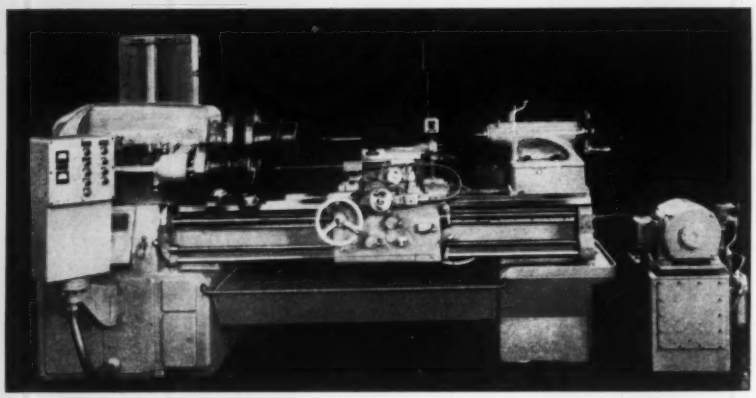
The heavy duty unit is available with magnetic brakes or standard friction drag brakes. Quick adjusting forks are standard on two models in this design.

One model handles material up to 10 in. wide on a maximum coil diameter of 44 in. and up to 500 lb.



The larger unit takes coils up to 1000 lb with 48 in. coils 13 in. wide.

For more information, *write* Durant Tool Co., Thurbers Avenue, Providence, R. I.



Lathe Machines Rotary Profiles

IMPROVED accuracy and faster boring of bottle molds having non-circular cross sections are the advantages of Monarch's new rotary profile tracer lathe.

It will handle most bottle mold work as well as all conventional turning, boring, and threading operations.

Heart of the machine is a sensitive electrohydraulic tracer. The head of the unit is built into a bar that is adjustably mounted at the front of the cross slide. Stylus deflection is 1½ ounces.

At a feed of 100 in. a minute, the tracer slide duplicates the profile within plus or minus 0.001 in. A female or male master can be used. With the master spindle locked, a half mold or conventional flat template may be used to guide the tool for boring or turning.

Because of the light stylus pressure, nonmetallic materials may be used as masters. For more information, *write* Monarch Machine Tool Co., Sidney, Ohio.

Steel Ground Oversize

ENGINEERED to tool and die shop requirements, a flat ground oil hardening tool steel is ground 0.014 to 0.016 in. oversize on thickness dimension.

Called Badger, it is an O1 type tool steel, containing tungsten and chromium.

It is recommended when improved wear resistance over straight manganese types is required. *Write*: Latrobe Steel Co., Latrobe, Pa. *Phone*: Keystone 7-7711

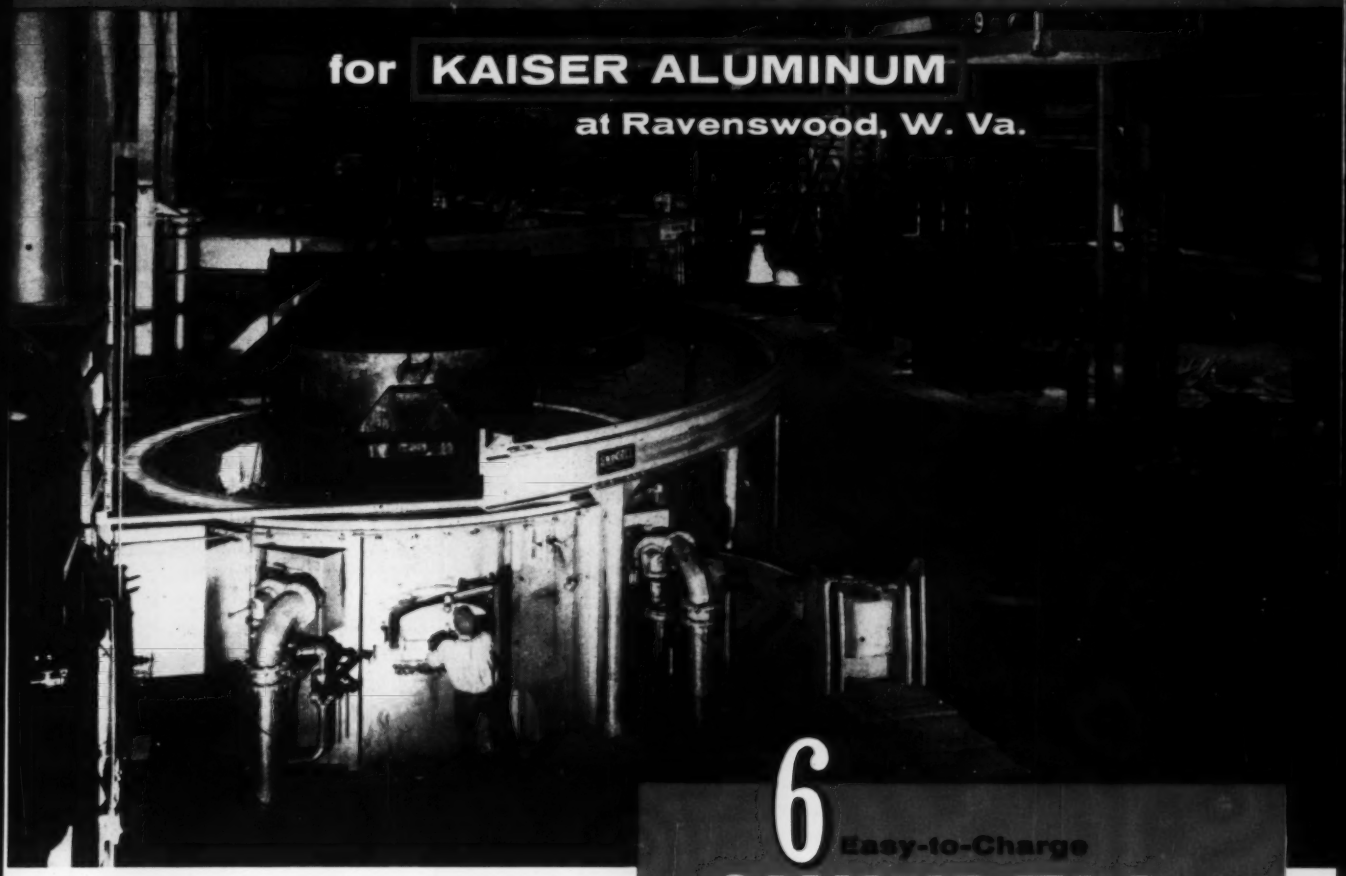
These Honing Machines Have Automatic Controls

HONING machine users get the advantages of mechanical brake-type honing tools with automatic control of tool expansion and retraction in either of two series of machines now available.

The machines can be set up for automatic operation under control

FIRST of their kind!

for KAISER ALUMINUM at Ravenswood, W. Va.



6 Easy-to-Charge SWINDELL CIRCULAR MELTING FURNACES with removable lift-and-swing roofs

A long step forward in ease and practicality of charging is represented in these new Swindell-designed and erected circular aluminum melting furnaces. Equipped with lift-and-swing removable roofs for top charging by bucket, each gas-fired furnace has a capacity of 60,000 lbs and melts aluminum scrap at the rate of 10,000 lbs per hour.

...and also

6 RECTANGULAR HOLDING FURNACES

—capacity 35,000 pounds apiece

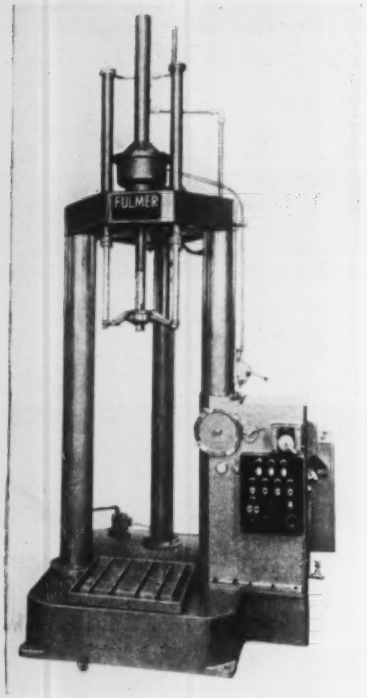
In conjunction with Kaiser Aluminum's new melting furnaces, the installation at Ravenswood also includes six new Swindell 35,000 lb rectangular holding furnaces.

● For any aluminum melting shop or heat treating requirement, consult Swindell-Dressler. Your inquiries are cordially welcome.

SWINDELL-DRESSLER *Corporation*

PITTSBURGH 30, PA.

NEW PRODUCTS and equipment



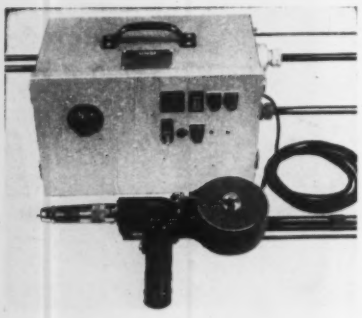
of a cycle timer or an automatic sizer. Tools also can be manually controlled.

Both machines are of the twin cylinder crosshead type. Model 12 Series has up to 60 in. strokes and 25 hp; Model 18 Series offers up to 120 in. strokes and 35 hp.

For more information, *write* C. Allen Fulmer Co., 105 E. Fourth St., Cincinnati, Ohio.

Inert Gas, Arcwelding Torch Is Portable

WHEN you have to take the welder to the work, you can do it with the Sigmette torch that does consumable electrode, inert gas arcwelding.



The wire spool is mounted on the torch which weighs 3 lb.

The control box weighs less than 20 lb.

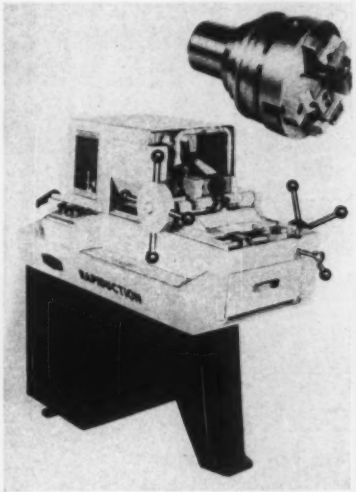
Rated at 200 amperes, the torch will handle the full welding range with 3/64 in. aluminum wire; aluminum 0.093 to 1/8 in. thick with 0.030 in. wire; limited applications with 1/16 in. aluminum wire; and 0.030 in. carbon steel wire,

For more information, *write* Linde Co., division of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.

Threading Machines Have Tangential Die Heads

THESE two bolt threading machines have tangential die heads and chasers that are semiautomatic. Movement of the vise carriage operates a device on the heads that trips them open when the desired thread length is reached, and resets them to the same size for duplicate threads.

Model No. 791-AT threads bolts or rods from 1/4 to 1 1/2 in. and pipe or nipples from 1/8 to 1 1/4 in. Model No. 792-AT threads bolts or rods from 1/4 to 2 in. and pipe or nipples from 1/8 to 2 in.



A number of accessories, such as a reaming and chamfering attachment for pipe nipple work, grips for holding short nipples, and stud grips are available. For more information, *write* Oster Mfg. Co., E. 289th Street and Nickel Plate R. R., Wickliffe, Ohio.

NEW literature

Write directly to the company for a copy

Cleaning and Phosphating

"How To Clean and Phosphate Metals in One Operation at Low Cost," a 16-page manual, covers the details of the steam cleaner phosphating process. Malsbary Mfg. Co., 845 92nd Ave., Oakland 3, Calif.

Improved Pouring Practice

This brochure is designed to assist steel plants in maintaining and improving pouring practice in the pit. Six recommendations are listed. Vesuvius Crucible Co., Pittsburgh 18, Pa.

Electric Hoist Catalog

Bulletin 158-G describes a line of hoists that includes three new larger capacity and higher speed models recently introduced. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.

Surface Heating Selector

Bulletin GEA 6146B shows how to select heating equipment and controls for surface heating. Engineering data are given to help you choose the right equipment. General Electric Co., Schenectady 5, N. Y.

Control Valve Catalog

An 8-page bulletin describes and gives specifications on air and hydraulic control valves. Manual, electrical mechanical, and pilot actuated types are included. Beckett-Harcum Co., 985 W. Locust St., Wilmington, Ohio.

Tips on Hydraulic Cylinders

"Aids for Preventing Excessive Bearing Wear and Column Failures" answers commonly encountered problems relating to hydraulic cylinder piston rods. Miller Fluid Power Div., Flick-Reedy Corp., 2040 N. Hawthorne Ave., Melrose Park, Ill.

Roof Ventilators

Design and construction features of 13 basic centrifugal roof ventilators including 111 different motor and belt drive combinations are listed in an 8-page brochure. American Blower Div., American Radiator & Standard Sanitary Corp., Detroit 32, Mich.

Magnetic Motor Starters

A 15-page booklet describes a line of alternating current magnetic starters in NEMA sizes 0 through 4 for reversing and nonreversing single phase and squirrel cage motors. Cutler-Hammer Inc., 320 N. 12th St., Milwaukee 1, Wis.

Steel Panel Scaffolding

An instructional handbook covers the use of steel panel scaffolding for shoring. Universal Mfg. Corp., Zelienople, Pa.

CALENDAR
OF MEETINGS

Jan. 19-20, Industrial Heating Equipment Association: Annual meeting, Hotel Sheraton-Cleveland, Cleveland. Association's address: Associations Bldg., Washington 6, D. C. Secretary: Robert E. Fleming.

Jan. 19-21, Southern Industrial Distributors Association: Winter meeting, Biltmore Hotel, Palm Beach, Fla. Association's address: 1626 Fulton National Bank Bldg., Atlanta, Ga. Secretary-treasurer: E. L. Pugh.

Jan. 19-22, American Road Builders Association: Annual meeting, Statler-Hilton Hotel, Dallas. Association's address: 600 World Center Bldg., Washington 6, D. C. Executive vice president: L. W. Prentiss.

Jan. 20-21, Steel Shipping Containers Institute Inc.: Winter meeting, St. Regis Hotel, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Jan. 21-23, American Management Association: Special packaging conference, Biltmore Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Jan. 21-25, National Tool & Die Manufacturers Association: Winter board meeting, Emerald Beach Hotel, Nassau, Bahamas. Association's address: 907 Public Square Bldg., Cleveland, Ohio. Executive vice president: George S. Eaton.

Jan. 22-23, National Industrial Conference Board Inc.: General session for all associates, Commodore Hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Jan. 25-29, Associated Equipment Distributors: Annual meeting, Conrad Hilton Hotel, Chicago. Association's address: 30 E. Cedar St., Chicago 11, Ill. Executive secretary: P. D. Hermann.

Jan. 26-28, American Management Association: West coast general management conference, Statler-Hilton Hotel, Los Angeles. Association's address: 1515 Broadway, New York 36, N. Y. General management division's manager: David J. Secunda.

Jan. 26-28, Truck-Trailer Manufacturers Association Inc.: Annual convention, Hollywood Beach Hotel, Hollywood, Fla. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 26-29, American Society of Heating & Air-Conditioning Engineers: International heating and air-conditioning exposition and annual meeting, Convention Hall, Philadelphia. Society's address: 62 Worth St., New York, N. Y. Executive secretary: A. V. Hutchinson.

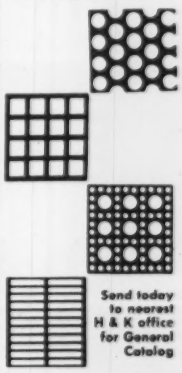
*Product Development by William M. Schmidt Associates.

H & K perforated metals serve a function of design

The orientation of television, AM-FM radio and phonographic elements into one modular housing containing all mechanical, electronic and control devices is one function of the mock-up illustrated. Another is the utilization of H & K perforated metal for the necessary ventilation and sound requirements of such equipment.

H & K Perforated Metal offers the Industrial Designer and other men of ideas, materials that are aesthetically interesting and functionally honest. If perforated materials can be utilized in your product, please contact us. Our sales engineers will be pleased to work with you.

A few of the thousands of H & K patterns are illustrated in reduced size



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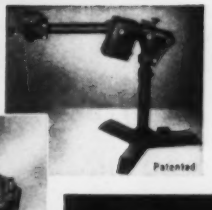
ARONSON Offers You Over 200 PROVEN Standard Stock Models of Quality POSITIONERS "POSITIONEERED" to your exact Requirements

Patented

Aronson TracTred (T. M. Reg.) Turning Rolls for thin-walled heavy cylindrical work to 27 tons capacity. Zero to 100 IPM turning speed and Built-In Grounding.

Aronson Universal Balance Positioners (T. M. Reg.) position your weldments effectively, instantly for downhand welding. Capacities to 2000 lbs.



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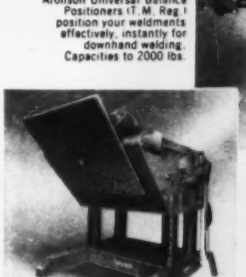

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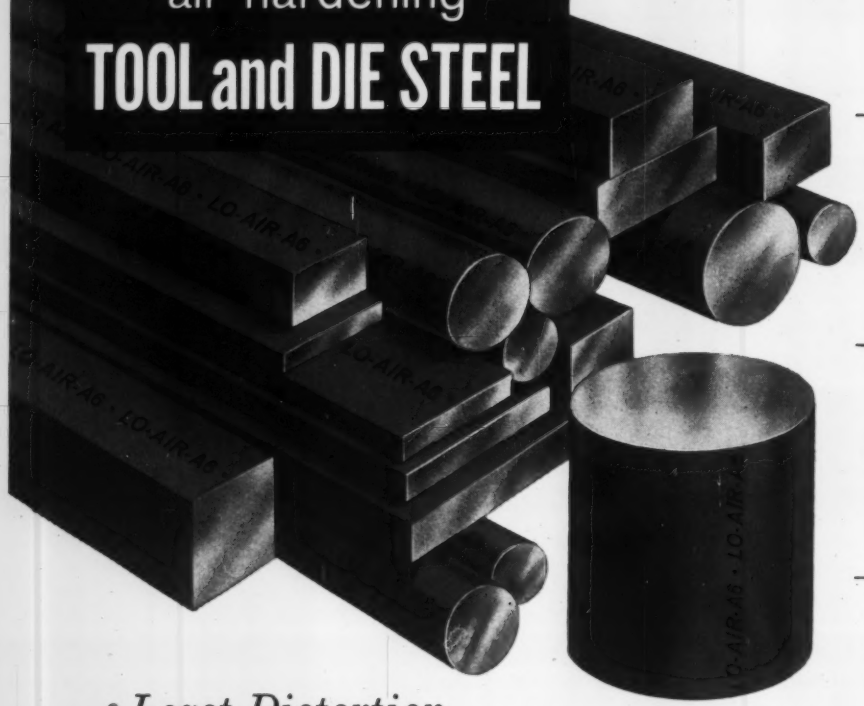

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Small Users Start Inventory Buildup

January 19, 1959

LOOK FOR steel consumers of all sizes to start replenishing their inventories soon. The movement's afoot already, but it's limited to the smaller users.

Automotive part suppliers are leading the parade. They've decided it's safe to stock up now that the car manufacturers have given them firm orders through June. The special steels they need are getting harder to obtain. Delivery promises for pickled strip and shim stock average five weeks in the Detroit area, and the market's tightening. As strike fears mount, even the more conservative buyers will start pressing for extra tonnage. Knowing this, suppliers of parts conclude that inventory accumulation is prudent.

SHEETS PACE MARKET—January shipments of cold-rolled sheets will equal or slightly exceed last month's. Since new orders are coming in at a faster rate than they did in December, the upward movement is expected to continue through February. Says a major producer: "We're fast approaching full production." A Chicago mill has its biggest backlog in two years. It's sold out through the first quarter on cold-rolled and galvanized sheets. Most of the tonnage is going to the automotive, appliance, and container industries.

DELIVERIES LENGTHEN—Although most mills can deliver cold-rolled sheets inside of eight weeks, some producers warn that ten weeks may soon be required for certain grades. As deliveries become more extended, consumers are trying to build up their stocks. They're especially concerned about coated sheet requirements. In many areas, demand for galvanized and aluminum coated products exceeds sales office quotas.

BIG USERS MARK TIME—Major steel consumers are asking more questions about deliveries, but they haven't started buying ahead. They're concerned only with immediate problems—getting assurances that the steel they've ordered will reach them when it's needed. Automakers aren't expected to step up their buying until the end of the first quarter.

TUBE SPECIALTIES GAIN—January order books for mechanical tubing are filling up fast, thanks to strong automotive demand and a trend toward inventory replacement. Shipments from one mill will be 30 per cent better than December's and the largest in 18 months. Tubemakers say their customers should build 45 day inventories as a strike safeguard. Boiler manufacturers are continuing their strong support of the pressure tubing market. To protect themselves against a strike, they're boosting their inventories from 60 to 90 days. If trouble's averted, they'll simply cut back on third quarter purchases.

TIN PLATE SHINES—Electrolytic tinning lines are running close to capacity as producers try to keep abreast of demand. January releases are excellent, and new orders are coming in at a brisk rate. Although current shipments are geared to users' consumption, it's believed that can companies will soon start building their inventories. Tin plate will probably have a better first half than it experienced in 1958.

PRODUCTION HOLDS—Last week, steelmaking operations held at 74.5 per cent of capacity. Production was about 2,109,000 net tons of steel for ingots and castings. STEEL's composite price on No. 1 heavy melting scrap advanced 66 cents to $40.33 a ton.

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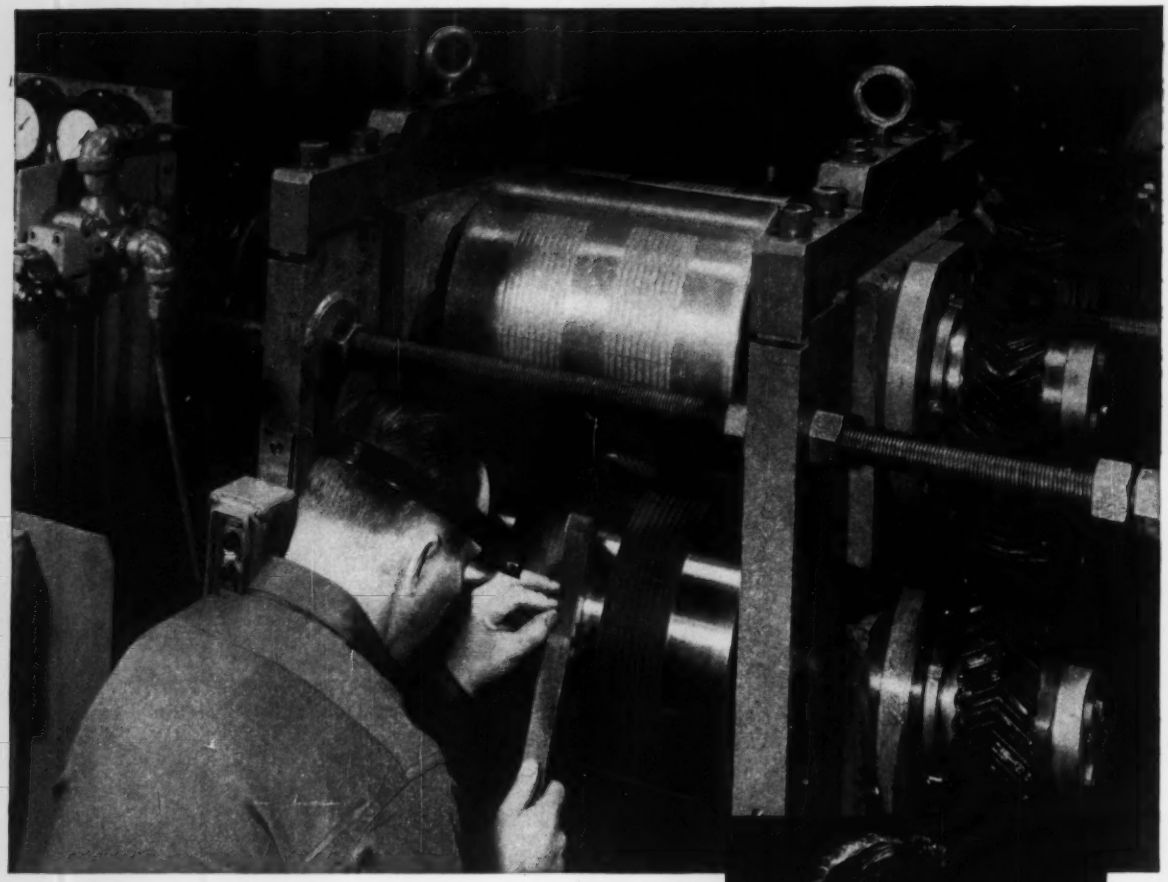
*Current prices were published in the Jan. 5 issue and will appear in subsequent issues.



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Union Carbide Metals' Intemann sees 25% sales rise as . . .

Ferroalloy Future Brightens

FERROALLOY sales in 1959 may top last year's by 25 per cent, predicts H. K. Intemann, president of Union Carbide Metals Co., a division of Union Carbide Corp., New York.

• **On the Upgrade**—In 1958, total ferroalloy sales were about 75 per cent of 1957's. Ferroalloys experienced a rise in sales with the resurgence of the steel industry in the last half of 1958. However, Mr. Intemann said, the improvement could not lift the entire year up to the 1957 level.

Among developments predicted by him for 1959 are:

• New, high temperature alloys and alloy steels for missiles, supersonic aircraft, and nuclear reactors.

• A larger market for heat resistant stainless steels.

• More titanium applications in the process industries which require corrosion resistance.

• Increasing use of titanium for structural and dynamic applications in the aircraft industry.

• New high strength vanadium alloys for high temperature applications.

• Larger sheets of thinner, purer tantalum.

• Growing use of columbium additions to carbon and possibly low alloy steels for grain improvement, increased strength, and toughness.

A broader industrial and commercial base may push stainless production to the million ingot ton level, surpassing 1958 by about 200,000 tons. This is to evolve despite military cutbacks, which hit traditional stainless markets.

Though small now, 200 series steels comprise a fast growing sector of the stainless market. Almost 30,000 tons were produced last year, about 5000 tons more than in 1957. During 1959, the production record set in 1958 should be broken.

In research and development, Mr. Intemann observed: "1959 will undoubtedly see many special alloy compositions introduced to metal producers, including a new, vacuum processed, low carbon ferrochrome and special ferroalloy compositions for the growing vacuum melting industry."

• **Warning Signs**—Imported alloys could influence domestic price stability and productivity in the year ahead. He commented: "A flood of low priced imports could impair the health of domestic ferroalloy and steel producers." In contrast with the last three years, ferroalloy producers will not be able to supply substantial quantities of their products to the government's stockpile of strategic materials. Only foreign producers will be able to participate because of present regulations.

The stable price structure of 1958 could be upset quickly if industry's labor costs rise any more. During the last year, price increases were held to an average of about 1 per cent despite increased labor and raw material costs.

• **Other Metals**—Aluminum alloys with improved physical characteristics have been made with low calcium silicon metal. The industry can expect the trend to continue.

Titanium sponge production will go up about 500 tons (to 45,000 tons) in 1959. The present low prices for sponge and billets may increase demand for titanium mill products.

Last year's sales of contained vanadium in all forms came to 2.5 million lb, 1.1 million lb under the 1957 total. One reason for the decline: The steep drop in tool steel production — ferrovanadium's chief market. High purity (ductile) vanadium showed spectacular increases in sales during this same period. (But total volume here is small.) The forecast for 1959: 3.4 million lb of vanadium will be consumed.

Columbium and tantalum are finding their niche in many industries and are more than in balance with demand. They are used mainly as structural materials in the nuclear field. Ferrocolumbium and ferrotantalum-columbium are also getting increased attention as stabilizers for stainless used in high temperature, high corrosion environments. Tantalum, now a standard in the electronic industry as a component of miniaturized capacitors, was demonstrated in 1958 as a corrosion resistant lining for large sized chemical reactor vessels.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 95 & 96

Republic Steel Corp., Cleveland, is shipping 20,000 tons of cold-rolled steel sheets to Russia. It's the first major shipment of American steel to the Soviet Union in several years. The order was placed through Greg-Gary Corp., an export-import firm in New York. The shipment will be completed next month. It is part of 33,000 tons licensed in the third quarter of last year for export to Russia. No shipments were licensed in the fourth quarter.

Under a separate agreement, Russia is sending to this country an equal value (about $3.5 million) of high grade chrome ore. A government official is quoted as saying there is no particular pressure to increase stockpiles of chrome ore at this time.

Under another transaction completed through Greg-Gary, a domestic producer will ship about $800,000 of steel to India and a U. S. buyer will receive an equal value of manganese ore.

Flat-rolled steel producers are sold out for the first quarter on practically all grades of coated sheets and are accepting only limited tonnages for shipment beyond March. On hot and cold rolled sheets, they can still make deliveries within an average of four to six weeks. But they report a general acceleration in demand, due in part to the possibility of a steel strike this summer. Says a sales executive at one of the big Pittsburgh mills: "We're fast approaching full production."

Plates . . .

Plate Prices, Page 94

While sheared plates are still available within two weeks, a spread of two to three weeks is more representative of the market. A tightening in supply, first noted particularly in the Midwest, is gradually being extended to the East.

Consumption is a little heavier, and more buying is being done for stock replenishment. A pickup in demand for specialties from the oil refining and chemical industries is noteworthy. A leading mill in the Southwest is booked solidly through March and is filling its April book rapidly.

Shops specializing in plate fabrication in the Seattle area report conditions are extremely slow. Much capacity is idle, and prospects for early improvement are not promising. Some small tankwork is pending.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 95

Outlook for the reinforcing bar market is bright on the basis of heavy demand expected from the construction industry. The road building industry will account for an especially large tonnage.

Heavy imports continue to darken the market picture for domestic producers in the Southwest. However, the Texas Highway Department is reported to have rejected about 75 per cent of the foreign reinforcing bar tonnage offered under various state jobs during the last several months. The reason: The material, much from Belgium, failed to meet requirements.

Tubular Goods . . .

Tubular Goods Prices, Page 100

January order books for mechanical tubing are filling up fast as automakers step up their buying and other consumers replenish low inventories. Steelmakers consider the trend "gratifying" since they're getting bigger orders from all industries. January shipments from one mill will be 30 per cent better than December's and the largest in 18 months. "We'll do even better next month," a Pittsburgh sales official comments. "In the first nine days of January, bookings for February reached two-thirds of this month's total."

Tubemakers are urging their customers to build 45-day inventories as a strike precaution. "Our advice is being heeded," a mill executive declares. "There has been a subtle shift in automotive buying."

Boiler manufacturers are continuing their strong support of the pressure tubing market. They're boosting their inventories from 60 to 90 days to protect themselves against a midyear steel strike. If there's no strike, they'll simply cut back on third quarter purchases. Second half demand is expected to taper off in any event because of the industry's cyclical nature.

Line pipe prospects for 1959 in southern California are bright. F. M. Banks, president and general manager of the Southern California Gas Co., says: "It will be the most active year in its history." A proposed Rock Springs line would consist of 206 miles of 34 in. pipe and compressor facilities on present and planned pipelines. If approved by the Public Utilities Commission and constructed, the facilities will account for nearly half the company's record capital budget of about $56 million.

Steel Bars . . .

Bar Prices, Page 94

Bar demand is broadening, and orders are slightly heavier. Deliveries still range from two to four weeks on hot-rolled carbon bars, although offerings are somewhat tighter. There is a tendency among buyers to replenish stocks. The betterment extends to alloys and cold drawn bars.

Stainless Steel . . .

Stainless Steel Prices, Page 100

Armco Steel Corp., Middletown, Ohio, increased base prices on stainless bars, wire, and billets as of Dec. 31. The increases ranged from 1 cent to 3.5 cents a pound. Armco's action follows similar changes made by Crucible Steel Co. of America on Dec. 15.

Republic Steel Corp., Cleveland, has revised its base prices on 304L and 316L types of stainless steels, effective with shipments on Jan. 12.

Substantial increases in shipments of stainless steel to various important consuming lines is predicted for this year. Automotive needs will rise in step with auto production. Last year, stainless shipments for use in autos totaled 72,871 net tons, down about 33 per cent from the preceding year's total.

Curtain wall construction will continue to play an important role in stainless steel architectural applications. One industry authority predicts 1959 stainless shipments for construction purposes will exceed 45,000 net tons.

Powerplant and airframe manufacturers plan to enlarge their use of stainless in missiles and aircraft. Shipments will exceed those

in 1958, and may approach those of 1957.

Markets in office equipment, kitchens, flatware, pots, and pans will continue to expand this year. Stainless shipments to fabricators of consumer goods will probably approach 41,500 net tons.

Distributors . . .

Prices, Page 101

Steel service centers in the Midwest and East report only a mild improvement in bookings. Business is down substantially from the year-ago level and is expected to recover slowly.

The market is much more active on the West Coast. Distributor sales in Los Angeles during December increased about 5 per cent over November's and are maintaining a strong pace this month.

An adjustment in stainless steel bar prices is expected to be made soon by some distributors because of increases posted by a few mills.

The Philadelphia plant of Joseph T. Ryerson & Son Inc. has resumed full operation following settlement of a three-month strike.

Pig Iron . . .

Pig Iron Prices, Page 101

The anticipated first quarter improvement in foundry business is slow in developing. Some shops making castings for the automotive industry are a little busier.

Foundries serving the railroad industry are more optimistic than they have been in months.

The Symington Gould Div., Symington Wayne Corp., Depew, N. Y., has raised production from 18 per cent of capacity (last summer) to almost 40 per cent. H. A. Mason, vice president, expects the upward trend to continue at least through the first quarter. He points out that demand for industrial steel castings has increased along with the heavier railroad casting business.

A mild gain in the movement of merchant iron is expected this month, reflecting some improvement in consumption but no special buying for stocking.

Structural Shapes . . .

Structural Shape Prices, Page 94

Shape deliveries haven't tightened appreciably and can be made within the usual range of two to four weeks. Little change is likely for another few weeks, or until construction requirements become heavy under the influence of more favorable weather conditions.

In the Los Angeles district, prices are firmer following a series of price cuttings. One fabricator refused to cut prices and took advantage of the resulting business lull to modernize its plant. Now, as prices firm, it is in an improved selling position.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

270 tons, federal building, Jamestown, N. Y., to Electroweld Mfg. Co., Erie, Pa.; R. S. Noonan Inc., York, Pa., general contractor.

210 tons, including 65 tons of reinforcing bars, Webb Road bridge, Waterville, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Reed & Reed, Woolwich, Maine, general contractor.

190 tons, junior high school, Sunnyside, Wash., to Union Iron Works, Spokane, Wash.; Yeaman Construction Co., Yakima, Wash., general contractor.

165 tons, including 45 tons, reinforcing bars, state highway bridge, Augusta, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Reed & Reed, Woolwich, Maine, general contractor.

140 tons, building, Merck, Sharpe & Dohme, West Point, Pa., through United Engineers & Constructors Inc., Philadelphia, to Frank M. Weaver & Co., Lansdale, Pa.

135 tons, engineering building, University of Rhode Island, Kingston, R. I., to Tower Iron Works, Providence, R. I.; J. L. Marshall Sons Inc., Pawtucket, R. I., general contractor.

130 tons, missile systems development laboratory, Raytheon Mfg. Co., Bedford, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Aberthaw Div., Cabot-Cabot & Forbes, Boston, general contractor; also 130 tons, bar joists, to Ceco Steel Products Co., Boston, and 70 tons, reinforcing bars, to Concrete Steel Co., Boston.

STRUCTURAL STEEL PENDING

225 tons, Oregon state overcrossing, Multnomah County; bids to Salem, Oreg., Jan. 20.

140 tons, research buildings No. 2 and No. 3, Penn State University, State College, Pa.; bids Jan. 20.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1210 tons, warehouse for Scott Paper Co., Everett, Wash., to Northwest Steel Rolling Mills Inc., Seattle; Newland Construction Co., Everett, general contractor.

325 tons, seven state highway structures, Medford, Mass., to Joseph T. Ryerson & Son Inc., Boston; Berke-Moore Co. Inc., Boston, general contractor; 1050 tons, structural steel, to West End Iron Works, Cambridge, Mass.

280 tons, federal building, Jamestown, N. Y., to Whitacre Construction Specialties Co., Rochester, N. Y.; R. S. Noonan Inc., York, Pa., general contractor.

250 tons, studio and office building, WHDH, Boston, to Truscon Steel Div., Republic Steel Corp., Boston; M. Spinelli & Sons Inc., Boston, general contractor; also 85 tons, structural steel, to West End Iron Works, Cambridge, Mass.

205 tons, addition, Jordan Hospital, Plymouth, Mass., to Northern Steel Inc., Medford, Mass.; Vara Construction Co., Boston, general contractor.

110 tons, Rose-Hill School, to Taylor-Davis, Wilmington, Del.

REINFORCING BARS PENDING

330 tons, public school, Philadelphia; pending.

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275 tons, reservoir, Ephrata, Pa.; bids asked.
225 tons, Washington state highway bridge, Yakima County; Everett McKellar, Chelan, Wash., low at $251,979.
155 tons, two Washington state girder bridges, King County; Dale M. Madden Construction Co., Seattle, low at $230,121.
115 tons, also 16 steel piles, Oregon state overcrossing, Multnomah County; bids to Salem, Oreg., Jan. 20.
90 tons, also 17 steel pilings, Oregon state Bear Creek bridge, Douglas County; bids to Salem, Oreg., Jan. 20.

December Steel Output Up

Steelmaking furnaces produced 85,257,363 net tons during 1958, says the American Iron & Steel Institute, New York, in a preliminary report. In 1957, production was 112,714,996 tons.

December output, totaling 8,713,000 net tons, was the second largest of the year, exceeded only by 8.8 million tons in October. The November figure was 8,569,318 tons.

Fourth quarter production of 26,122,096 tons was the largest for any quarter last year. It also exceeded output for the fourth quarter of 1957 (25,010,921 tons).

During the second half, production came to 47,504,876 tons, compared with 37,752,487 tons in the first half of '58 and 52,131,449 tons in the second half of 1957.

The institute's index of steelmaking shows that December output was 122.5—in terms of the basic index of average production during 1947-49. Comparisons: 124.5 during November, 1958, and 104.3 in December, 1957. For the year, the index was 101.8, against 134.6 in 1957. For the fourth quarter, the index was 123.7, against 101.3 in the preceding quarter and 118.5 in the like 1957 period. For the second half, the index was 112.5, against 90.9 in the first half of the year and 123.5 in the second half of 1957.

Based on the Jan. 1, 1958, annual capacity rating of 140,742,570 tons, steelmaking facilities operated at an average rate of 72.9 per cent during December, 73.6 per cent in the fourth quarter, 67 per cent in the second half of 1958, and 60.6 per cent for the entire year.

Steel Ingot Production—December, 1958

Period	—OPEN HEARTH— Net tons	Per cent of capacity	—BESSEMER— Net tons	Per cent of capacity	—ELECTRIC— Net tons	Per cent of capacity	—TOTAL— Net tons	Per cent of capacity
1958								
January ..	6,085,124	58.6	121,338	35.5	547,440	44.8	6,753,912	56.5
February .	5,252,112	56.0	81,597	26.4	448,614	40.6	5,782,323	53.6
March	5,598,944	53.9	122,317	35.8	533,361	43.6	6,254,622	52.3
1st Qtr. ..	16,936,180	56.2	325,252	32.8	1,529,425	43.1	18,790,857	54.1
April	4,875,619	48.5	109,433	33.1	547,939	46.3	5,532,991	47.8
May	5,602,123	53.9	110,366	32.3	588,670	48.2	6,301,159	52.7
June	6,378,942	63.4	88,125	26.6	660,413	55.8	7,127,480	61.6
2nd Qtr. ..	16,856,684	55.3	307,924	30.7	1,797,022	50.1	18,961,630	54.0
1st 6 Mo..	33,792,864	55.7	633,176	31.7	3,326,447	46.6	37,752,487	54.1
*July	5,712,587	55.0	114,218	33.4	615,600	50.4	6,442,405	53.9
*August ..	6,481,185	62.4	134,435	39.3	692,383	56.6	7,308,003	61.1
*September.	6,769,660	67.3	103,194	31.2	759,518	64.2	7,632,372	66.0
*3rd Qtr...	18,963,432	61.5	351,847	34.7	2,067,501	57.0	21,382,780	60.3
*9 Mo.	52,756,296	57.7	985,023	32.7	5,393,948	50.1	59,135,267	56.2
*October ..	7,795,541	75.0	148,458	43.4	895,779	73.3	8,839,778	74.0
*November.	7,572,555	75.3	145,867	44.1	850,896	71.9	8,569,318	74.1
†December.	7,764,000	74.7	117,000	34.2	832,000	68.1	8,713,000	72.9
†4th Qtr. ..	23,132,096	75.0	411,325	40.5	2,578,675	71.1	26,122,096	73.6
†2nd 6 Mo.	42,095,528	68.3	763,172	37.6	4,646,176	64.0	47,504,876	67.0
†Total	75,888,392	62.0	1,396,348	34.7	7,972,623	55.4	85,257,363	60.6
1957								
January ..	9,829,691	99.0	294,839	77.1	884,232	86.5	11,008,762	97.1
February .	8,898,671	99.2	227,682	80.4	810,853	87.8	9,987,206	97.6
March	9,442,164	95.1	275,156	71.9	871,754	85.2	10,589,074	93.4
1st Qtr. ..	28,170,526	97.7	847,677	76.3	2,566,839	86.4	31,585,042	96.0
April	8,820,328	91.8	231,731	62.6	762,721	77.1	9,814,780	89.5
May	8,842,707	89.1	201,864	52.8	747,752	73.1	9,792,323	86.4
June	8,498,903	88.4	210,915	57.0	681,154	68.9	9,391,402	85.6
2nd Qtr. ..	26,161,938	89.8	644,510	57.4	2,192,057	73.0	28,998,505	87.2
1st 6 mo. .	54,332,464	93.7	1,492,187	66.8	4,758,896	79.7	60,583,547	91.5
July	8,086,519	81.4	194,638	50.9	627,575	61.4	8,908,732	78.6
August ...	8,297,172	83.6	204,723	53.5	731,995	71.6	9,233,890	81.5
September..	8,135,139	84.7	185,967	50.2	656,800	66.4	8,977,906	81.8
3rd Qtr. ..	24,518,830	83.2	585,328	51.5	2,016,370	66.4	27,120,528	80.6
9 Mo.	78,851,294	90.2	2,077,515	61.7	6,775,266	75.2	87,704,075	87.9
October ...	8,348,522	84.1	154,577	40.4	694,618	67.9	9,197,717	81.1
November .	7,674,698	79.9	134,709	36.4	583,512	59.0	8,392,919	76.5
December .	6,783,262	68.3	108,237	28.3	528,686	51.7	7,420,285	65.5
4th Qtr. ..	22,806,482	77.4	397,623	35.0	1,806,816	59.5	25,010,921	74.4
2nd 6 Mo..	47,325,312	80.3	982,951	43.3	3,823,186	63.0	52,131,449	77.5
Total	101,657,776	87.0	2,475,138	54.9	8,582,082	71.3	112,714,996	84.5

Note—The percentages are based on annual capacities as of Jan. 1, 1958: Openhearth, 122,321,830 net tons; bessemer, 4,027,000 net tons; oxygen process, electric, and crucible, 14,393,740 net tons. Total: 140,742,570 net tons. In 1957, the capacity tonnages were: Open hearth, 116,912,410 net tons; bessemer, 4,505,000 net tons; oxygen process, electric, and crucible, 12,041,740 net tons. Total, 1957: 133,459,150 net tons.
*Revised. †Preliminary.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

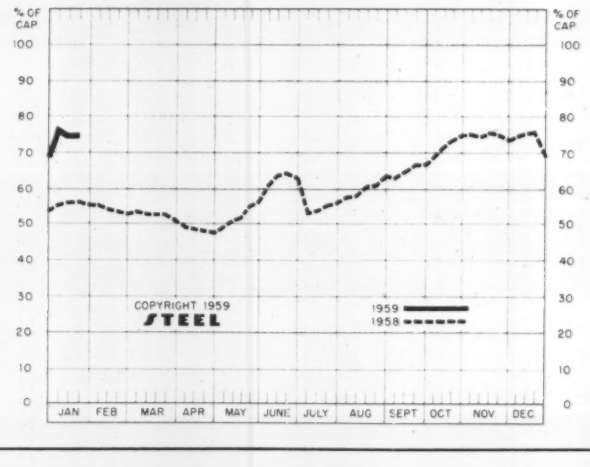
	Week Ended Jan. 18	Change	Same Week 1958	Same Week 1957
Pittsburgh	76	+ 1*	57	99
Chicago	81	+ 1*	62	98
Eastern	75	+ 1	76	100
Youngstown	64	— 1	55	100
Wheeling	84	0	56	98
Cleveland	86	+ 5*	46	92.5
Buffalo	63.5	— 2.5	53.5	107.5
Birmingham	70.5	0	58	97.5
Cincinnati	87	+ 5	62.5	97
St. Louis	92	— 7.5*	62.5	100.5
Detroit	95	0*	56.5	103.5
Western	74	0	79	101
National Rate ..	74.5	0	56	98.5

INGOT PRODUCTION‡

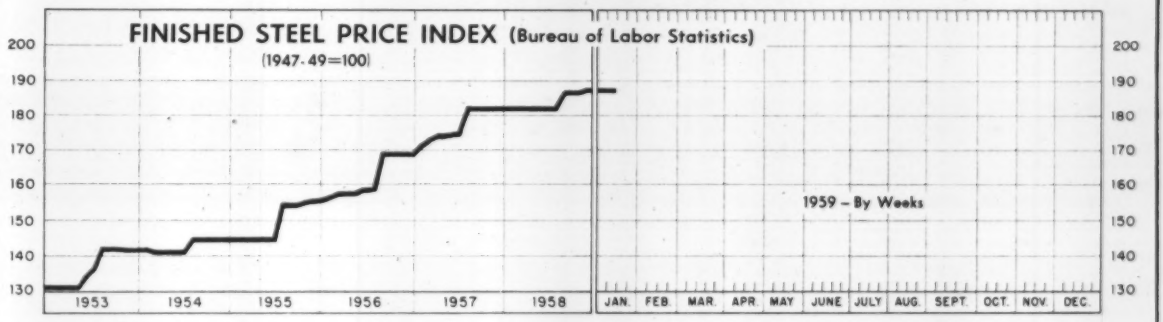
	Week Ended Jan. 18	Week Ago	Month Ago	Year Ago
INDEX ..... (1947-49=100)	132.2†	129.8	125.2	95.7
NET TONS .... (In thousands)	2,123†	2,085	2,011	1,538

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,831,486 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Jan. 13, 1959	Week Ago	Month Ago	Dec. Avg	Year Ago
187.0	186.9	186.9	186.9	181.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 13

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.540
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.695
Sheets, C.R., Stainless, 302 (lb)	0.688
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.493
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.903
Pipe, Galv., Buttweld (100 ft)	23.583
Pipe, Line (100 ft)	199.53
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	26.157
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.663
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common	9.828
Wire, Barbed (80-rod spool)	8.719
Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Jan. 14 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	239.15	189.74
Index in cents per lb	6.713	6.713	6.713	6.479	5.140

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$145.42	$113.91
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	40.33	39.66	39.17	33.33	29.17

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Jan. 14 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.425	4.15
Bars, H.R., Chicago	5.675	5.675	5.675	5.425	4.15
Bars, H.R., deld. Philadelphia	5.975	5.975	5.975	5.725	5.302
Bars, C.F., Pittsburgh	7.65*	7.65*	7.65*	7.30*	5.20
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.275	4.10
Shapes, Std., Chicago	5.50	5.50	5.50	5.275	4.10
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.545	4.38
Plates, Pittsburgh	5.30	5.30	5.30	5.10	4.10
Plates, Chicago	5.30	5.30	5.30	5.10	4.10
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.10	4.35
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.10	4.10
Plates, Claymont, Del.	5.30	5.30	5.30	5.10	4.55
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	4.925	3.925
Sheets, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Chicago	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Detroit	6.275	6.275	6.275	6.05-6.15	4.975
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.60	5.275
Strip, H.R., Pittsburgh	5.10	5.10	5.10	4.925	4.425
Strip, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.15	5.45
Strip, C.R., Chicago	7.425	7.425	7.425	7.15	5.70
Strip, C.R., Detroit	7.425	7.425	7.425	7.25	5.45-6.05
Wire, Basic, Pittsburgh	8.00	8.00	8.00	7.65	5.525
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.55
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$96.00	$75.50
Wire rods ⅜-⅝" Pitts.	6.40	6.40	6.40	6.15	4.525

PIG IRON, Gross Ton

	Jan. 14 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Phila.	70.41	70.41	70.41	70.01	60.75
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.51	61.25
No. 2 Fdry, Birm.	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$42.50	$42.50	$41.50	$32.50	$30.50
No. 1 Heavy Melt, E. Pa.	36.00	34.00	34.00	37.00	28.00
No. 1 Heavy Melt, Chicago	42.50	42.50	42.00	30.50	29.00
No. 1 Heavy Melt, Valley	43.50	43.50	42.50	30.50	29.50
No. 1 Heavy Melt, Cleve.	39.50	39.50	39.00	27.50	28.50
No. 1 Heavy Melt, Buffalo	35.50	35.50	33.50	28.50	27.50
Rails, Rerolling, Chicago	62.50	62.50	62.50	49.50	38.00
No. 1 Cast, Chicago	46.50	45.50	45.50	39.50	32.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	30.50	30.50	30.50	30.50	25.25

Steel Prices

Mill prices as reported to STEEL, Jan. 14, cents per pound except as otherwise noted. Changes shown in italics. Code number following mill points indicates producing company. Key to producers, page 95, footnotes, page 99.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B3 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 .104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....113.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 .99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$119.00
Bridgeport,Conn. C32 .119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 .....119.00
Conshohocken,Pa. A3 .126.00
Detroit S41 .....119.00
Economy,Pa. B14 .....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ....119.00
Johnstown,Pa. B2 .....119.00
Lackawanna,N.Y. B2 ..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 .119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
N.Tonawanda,N.Y. B11..6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 .....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2 ..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Struthers,O. Y1 .....8.05

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S8 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, ALLOY
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L17 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa.(9) J5 ..5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ....5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ...6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ...5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo.(9) S5 ..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ...6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
N.T'wan'a,N.Y.(23)B11 6.025
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle B3, N14 .....6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 .....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 .....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 .....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra)

Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12 ..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 .....10.35

*Grade A; add 0.050c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ...7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ...9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B2 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 .....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md. (5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ...9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2 ...9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. B5 .....9.025
Lackawanna,N.Y. B2 ...9.025
LosAngeles P2, S30 ..11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 .....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ...9.325
Worcester,Mass. A7 ....9.375
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.925
Seattle S3, N14 .....6.425
S.Chicago,Ill. R2, W14 5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ....5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ....6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated; to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle B3, N14 .....7.95
SparrowsPt.,Md. B2 ...7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Lackawanna,N.Y. B2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1.7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14..7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ..7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Allenport,Pa. P7 .....6.275
Aliquippa,Pa. J5 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1.6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind Harbor,Ind. I-2, Y1.9.275
Lackawanna(37) B2 ...9.275
Pittsburgh J5 .....9.275
SpparowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.Calif. C11	7.975	....
SparrowsPt. B2	7.225	....
Pittsburgh J5	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875†
Ashland,Ky. A10 ....6.875†
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875‡
GraniteCity,Ill. G4 ....6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875‡
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10 .6.875*
Middletown, O. A10 ..6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
SparrowsPt.(39) B2 ..10.025
Pittsburgh J5 .....10.125

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Youngstown J5 .....7.50
Weirton,W.Va. W6 ....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
GraniteCity,Ill. G4 ....6.875
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest.Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Nevilie Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron&Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Corp.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Buffalo(27) R2	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle (25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2,Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. F4	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Wallingford,Conn. W2	7.875
Warren O. R2, T5	7.425
Worcester Mass. A7	7.975
Youngstown S41, Y1	7.425

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. C18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison,N.J. C18	...	...	18.85	22.95	27.80
New York W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (20-27 Ga.; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.90	8.10	...
Niles,O. R2	7.90	8.10	8.30

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fairless,Pa. U5..	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5 ...	10.40	10.65
Ind.Harb. Y1 ...	10.40	10.65
Pitts.,Calif. C11.	11.05	11.30
Sp Pt.,Md. B2 ..	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.25
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.55	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.50
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
N.Tonawanda,N.Y. B11	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W2	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass.A7,J4,T6	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5	10.00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass.A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C10	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow

Roebling Tire Bead Wire: Packaged for Maximum Benefit

The problems eliminated by this unique reel-less core packaging system are manifold. Loads are palletized two cores per pallet and may be stacked two or three high. This, plus the fact that you need not accumulate empty reels means storage space requirements are cut to *less than half*. You do away with all freight and handling costs on reels, the bother and expense of "bookkeeping" returnable reels, and the freezing of money in reel deposits.

This is typical of Roebling's advanced packaging methods—that makes handling Roebling high-quality wire so much easier. For details on this efficient Roebling Tire Bead Wire packaging method, or information on other types of Roebling wire, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Quantity PRODUCTION of GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	11.65
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	11.95
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) To Dealers (33)

Wheeling,W.Va. W10	$9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	10.26
Chicago W13	10.26
Crawfordsville,Ind. M8	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. M8	10.36
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill. (37) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.60
Chicago W13	10.60
Crawfordsville,Ind. M8	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. M8	10.70
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill. (37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.65
Chicago W13	10.65
Crawfordsville,Ind. M8	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. M8	10.75
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill. (37) N15	10.75

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill. (7) N15	214

FENCE POSTS

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Sterling,Ill. (1) N15	177
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill. (7) N15	198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala. R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.75
Cleveland A7	17.85	....
Craw'dsville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'im'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
Sterling(37)N15	17.25	19.05††
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.10	9.775§
Bartonville(48) K4	9.10	9.775
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80‡‡
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown B2(48)	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
Kans.City(48) S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
Sterling(48) N15	9.25	9.925††
St'ling(1)(48)N15	9.15	9.825††
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50. †5c. $10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts

Full Size Body (cut thread)

½ in. and smaller

3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1⅛ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:

3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts

Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:

6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:

6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts

(Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam.	50.0
¾ in. diam.	47.0
⅞ and 1 in. diam.	43.0
1⅛ and 1¼ in. diam.	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy

Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

⅝ in. and smaller	35.0
¾ in. and 1 in.	16.0

Longer than 6 in.:

⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0

Longer than 6 in.:

⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter +85.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:

6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

⅞ in. and smaller by 6 in. and shorter: 15.0%.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	32.15	48.20	61.55	81.10	105.65
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	....	43.40	55.40	73.00	....
Pueblo,Colo. W12	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Rails				
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.50
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh P14	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+7.75
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	0.5	+28	+11.5	+37	+22	+45.5	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.25	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	40.00	42.00	39.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	40.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	41.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	42.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	44.50	57.00	57.00
303	....	32.00	41.00	46.00	45.50	48.00	45.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	45.75	55.00	55.00
304L	....	....	48.25	51.50	53.00	55.50	53.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	46.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	55.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	66.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	87.75	96.75	96.75
314	....	....	77.50	....	86.50	91.00	87.75	99.00	104.25
316	39.75	49.50	62.25	69.25	69.25	73.00	71.75	80.75	80.75
316L	....	55.50	70.00	76.50	77.00	80.75	79.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	88.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	54.75	65.50	65.50
330	....	....	118.75	....	132.00	138.50	135.50	149.25	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	64.75	79.25	79.25
403	....	....	28.25	....	32.00	33.75	30.00	40.25	40.25
405	19.50	25.50	29.75	36.00	33.50	35.25	32.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	30.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	31.25	48.25	48.25
420	26.00	33.50	34.25	41.75	39.25	41.25	40.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	31.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	31.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	41.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	42.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp., Washington Steel Corp.

Clad Steel

Stainless	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates 20%	Sheets Carbon Base 20%
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20 55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
*Copper**	*35.55*	*42.05*

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3, nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	W-Cr Hot Work (H-12)	0.530
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.50*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	68.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% and $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	108.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24 #	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85 #	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.48	....	8.51	8.99	....	....	9.00	8.89	10.98
Boston	9.31	10.40	11.97	53.50	9.73	10.11	13.39 #	15.71	10.01	10.02	11.85
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45 #	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.50	53.00	8.51	8.99	9.15	15.06	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.56	53.43	8.83	9.31	11.53 #	15.37	9.56	9.27	10.53
Cleveland	8.36	9.54	10.65	52.33	8.63	9.10	11.25 #	15.16	9.39	9.13	10.44
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.26	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.80[2]	12.15[2]	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25 #	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	11.10	53.08	9.64	9.99	13.25 #	15.50	9.74	9.77	11.06
Norfolk, Va.	8.40	....	....	....	9.10	9.10	12.00	....	9.40	8.85	10.35
Philadelphia	8.20	9.25	11.34	52.71	9.25	9.40	11.95 #	15.48	9.10	9.15	10.40**
Pittsburgh	8.35	9.55	10.90	52.00	8.61	8.99	11.25 #	15.06	9.00	8.89	10.20
Richmond, Va.	8.40	....	10.40	....	9.10	9.00	....	....	9.40	8.85	10.35
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.00	16.00	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.35	11.55	12.55	57.38	10.80	11.05	14.70	16.80	10.25	10.15	13.06
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **¼ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; # net price, 1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [5]—1000 to 4999 lb; [6]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $168; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $145; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish:	
98% Fe:	
F.o.b. Camden or Riverton, N. J., freight allowed east of Mississippi river, ocean bags, 23,000 lb and over	11.25
Sponge Iron, Domestic, 98% Fe:	
Deld. east of Mississippi River 23,000 lb and over	11.25
100 mesh	9.10
40 mesh	8.10
Electrolytic Iron, Melting stock, 99.87% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microne, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh	
Aluminum:	
Atomized, 500-lb drum, freight allowed Carlots	38.50
Ton lots	40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	33.00-48.90†
Bronze, 5000-lb lots	49.60-53.70†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	74.00
Nickel-Silver, 5000-lb lots	50.99-55.40†
Phosphor-Copper, 5000-lb lots	61.80
Copper (atomized) 5000-lb lots	42.30-50.80†
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.07
Stainless Steel, 316	$1.26
Tin	14.00*
Zinc, 5000-lb lots	19.00-32.20‡
Tungsten: Melting grade, 99% 60 to 200 mesh, nominal:	Dollars
1000 lb and over	3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr, min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5⅛	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.10	$5.10	$5.00	$5.45
Bar Size Angles	5.00	5.00	4.90	5.33
Structural Angles	5.00	5.00	4.90	5.33
I-Beams	5.06	5.06	4.96	5.40
Channels	5.06	5.06	4.96	5.40
Plates (basic bessemer)	6.62	6.62	6.62	6.94
Sheets, H.R.	8.20	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	8.75	8.75	8.75	9.12
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.71	25.59	25.59	26.46
Barbed Wire (†)	6.60	6.60	6.60	6.95
Merchant Bars	5.40	5.40	5.35	5.90
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	5.15	5.28	5.10	5.45
Wire Rods, O.H. Cold Heading Quality No. 5	6.05	6.18	6.00	6.30
Bright Common Wire Nails (§)	7.89	7.75	7.67	8.26

†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1958 shipping season, gross ton, 51.50% iron natural rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	18.00-19.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	23.00
N. African hematite (spot)	nom
Brazilian iron ore, 68.5%	26.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$12.25-$12.50*
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian (export tax included) $1.10 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$42.00-44.00
48% 2.8:1	38.00-40.00
48% no ratio	29.00-31.00
South African Transvaal	
44% no ratio	22.00-23.00
48% no ratio	29.00-31.00
Turkish	
48% 3:1	51.00-55.00
Domestic	
Rail nearest seller	
18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.45
Saginaw, Mich., deld.	34.03
Erie, Pa., ovens	30.50
Everett, Mass., ovens:	
New England, deld.	*33.55**
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.18
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal., f.o.b. tank cars or tank trucks, plant

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	22.00
Naphthalene, 78 deg	7.00
Toluene, one deg. (del. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, del.	
Phenol, 90 per cent grade	15.50
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$42.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheriden, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively. (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot,add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload, 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload ,lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $240 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $245.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $290 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $295.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67-71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 61-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload packed, 8M x D, 21.25c per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr. 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade, (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2 % max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Contract, carload, lump, bulk, 14.6c per lb of contained Si. Packed c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 20c per lb of contained Si. Packed c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing min 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4 % B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Contract, lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%) Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅝ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Contract, carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb, f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Ton lots 2" x D, $4 per lb of contained Cb; less ton lots $4.05 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.80 per lb of contained Cb plus Ta, delivered; less ton lots $3.85 (nominal).

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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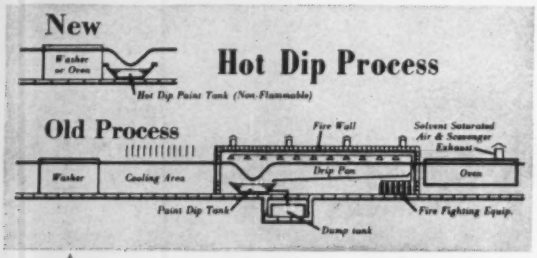

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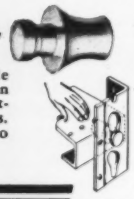

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Scrap Prices Rise on Light Sales

STEEL's composite on No. 1 heavy melting advances 66 cents to $40.33, highest since November. Supplies seem ample to meet gradual increase in consumption

Scrap Prices, Page 106

Philadelphia — Prices on prime grades of open hearth scrap jumped $2 a ton here on moderate sized orders. Market quotations are $36, delivered, on No. 1 heavy melting steel and No. 1 busheling; $37 on No. 1 bundles; and $33 on No. 2 heavy melting.

Since the advance late last year on tonnage for the Fairless Works, no further increase has been made on No. 2 bundles. One sale made recently at a $1 concession resulted in a market spread of $23.50 to $24.50, delivered.

Contributing to the recent advances has been competition from Pittsburgh and Youngstown mills. Noteworthy, but of much lesser bearing, is the accumulation of scrap here for early export. A part cargo (possibly 4000 tons) will be picked up soon, the first here in several months.

New York—Greater optimism is reflected here, although trading is quiet. Brokers' buying prices are unchanged except for an advance of $1 a ton in heavy breakable cast to $32-$33.

Chicago—Activity in the local scrap market continues to drag. Demand is light, and price changes are minor. Needs are covered without any strain on supply although the district steelmaking rate is rising slowly—it's at 81 per cent of Jan. 1, 1959, capacity, the highest level tonnagewise since June, 1957.

Pittsburgh—Brokers are talking a strong market, but there has been no good test lately. Most grades remain firm despite dearth of buying. If there's any strength, it's in railroad and industrial items. Buyers are bidding $1.50 to $2 more for factory bundles and railroad specialties than they offered in December. No. 1 dealer bundles are up $1 on a local mill's purchase, but some observers think the material involved was high quality factory scrap.

Detroit—The local scrap market is quiet, but dealers and brokers indicate the undertone is strong. Chrysler closed its plants Jan. 16 because of the glass strike. Some scrap dealer speculation resulted.

St. Louis—Moderate activity in the scrap market here is supported by continuing promise of higher industrial operations. Mills in the area report larger orders and are increasing production. Scrap dealers are conserving their supplies, hoping for higher prices. But a considerable tonnage of material is moving.

Buffalo—No. 1 and No. 2 heavy melting steel scrap are up $2 a ton as a result of new mill orders. Dealers have reduced their buying price on No. 2 bundles, however, no new business in this grade having been placed by the leading consumer this month.

Cast scrap prices have softened a bit due to lack of foundry buying. Prices of cupola and No. 1 machinery cast are down $1 a ton. New

(*Please turn to Page* 112)

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Jan. 14, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Jan. 14	$40.33
Jan. 7	39.67
Dec. Avg.	39.47
Jan. 1958	34.10
Jan. 1954	29.05

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	35.00-36.00
No. 1 dealer bundles	*44.00-45.00*
No. 2 bundles	31.00-32.00
No. 1 busheling	42.00-43.00
No. 1 factory bundles	48.00-49.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Cut structurals:	
2 ft and under	49.00-50.00
3 ft lengths	48.00-49.00
Heavy turnings	34.00-35.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	49.00-50.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	41.00-42.00
Unstripped motor blocks	31.00-32.00
Clean auto cast	39.00-40.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Random rails	*54.00-55.00*
Railroad specialties	*50.00-51.00*
Angles, splice bars	*50.00-51.00*
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles & solids	225.00-230.00
18-8 turnings	125.00-130.00
430 bundles & solids	125.00-130.00
430 bundles	55.00-65.00

CHICAGO

No. 1 hvy melt, indus.	43.00-44.00
No. 1 heavy melt, dealer	41.00-42.00
No. 2 heavy melting	*36.00-37.00*
No. 1 factory bundles	46.00-47.00
No. 1 dealer bundles	*43.00-44.00*
No. 2 bundles	29.00-30.00
No. 1 busheling, indus.	43.00-44.00
No. 1 busheling, dealer	41.00-42.00
Machine shop turnings	21.00-22.00
Mixed borings, turnings	23.00-24.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut structurals, 3 ft	*48.00-49.00*
Punchings & plate scrap	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Stove plate	*44.00-45.00*
Unstripped motor blocks	*38.00-39.00*
Clean auto cast	*53.00-54.00*
Drop broken machinery	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	57.00-58.00
Rails, 2 ft and under	58.00-59.00
Rails, 18 in. and under	59.00-60.00
Angles, splice bars	54.00-55.00
Axles	69.00-70.00
Rails, rerolling	62.00-63.00

Stainless Steel Scrap

18-8 bundles & solids	215.00-220.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	45.00-50.00

YOUNGSTOWN

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	29.00-30.00
No. 1 busheling	43.00-44.00
No. 1 bundles	43.00-44.00
No. 2 bundles	29.00-30.00
Machine shop turnings	15.00-16.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	43.00-44.00
Electric furnace bundles	43.00-44.00

Railroad Scrap

N. 1 R.R. heavy melt.	44.00-45.00

CLEVELAND

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	25.00-26.00
No. 1 factory bundles	43.00-44.00
No. 1 bundles	39.00-40.00
No. 2 bundles	28.50-29.50
No. 1 busheling	39.00-40.00
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut foundry steel	39.00-40.00
Cut structurals, plates 2 ft and under	47.00-48.00
Low phos, punching & plate	40.00-41.00
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	39.00-40.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	37.00-38.00
Heavy breakable cast	36.00-37.00
Stove plate	43.00-44.00
Unstripped motor blocks	32.00-33.00
Brake shoes	36.00-37.00
Clean auto cast	49.00-50.00
Burnt cast	33.00-34.00
Drop broken machinery	49.00-50.00

Railroad Scrap

R.R. malleable	63.00-64.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	52.00-53.00
Cast steel	49.00-50.00
Railroad specialties	50.00-51.00
Uncut tires	43.00-44.00
Angles, splice bars	50.00-51.00
Rails, rerolling	56.00-57.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	205.00-215.00
18-8 turnings	115.00-120.00
430 clips, bundles, solids	110.00-120.00
430 turnings	40.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	37.00
No. 2 heavy melting	35.00
No. 1 bundles	39.00
No. 2 bundles	27.00
No. 1 busheling	39.00
Machine shop turnings	18.50†
Short shovel turnings	20.50†

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	40.00
Heavy breakable cast	38.00
Unstripped motor blocks	39.00
Clean auto cast	48.00
Stove plate	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00†
Rails, 18 in. and under	52.00†
Rails, random lengths	46.50†
Rails, rerolling	58.00
Angles, splice bars	47.00

BIRMINGHAM

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 bundles	*33.00-34.00*
No. 2 bundles	21.00-22.00
No. 1 busheling	*33.00-34.00*
Cast iron borings	*14.00-15.00*
Machine shop turnings	21.00-22.00
Short shovel turnings	22.00-23.00
Bars, crops and plates	42.00-43.00
Structurals & plates	41.00-42.00
Electric furnace bundles	37.00-38.00
Electric furnace:	
2 ft and under	*35.00-36.00*
3 ft and under	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	*53.00-54.00*
Charging box cast	29.00-30.00
Unstripped motor blocks	40.00-41.00
No. 1 wheels	*41.00-42.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*38.00-39.00*
Rails, 18 in. and under	*47.00-48.00*
Rails, rerolling	*56.00-57.00*
Rails, random lengths	*42.00-43.00*
Angles, splice bars	*42.00-43.00*

PHILADELPHIA

No. 1 heavy melting	*36.00*
No. 2 heavy melting	*33.00*
No. 1 bundles	*37.00*
No. 2 bundles	*23.50-24.50*
No. 1 busheling	*36.00*
Electric furnace bundles	*38.00-39.00*
Mixed borings, turnings	18.00†
Short shovel turnings	*22.00*
Machine shop turnings	*19.00*
Heavy turnings	30.00
Structurals & plate	*41.00-42.00*
Couplers, springs, wheels	*44.00*
Rails, crops, 2 ft & under	*57.00-58.00*

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	41.00
Malleable	62.00
Drop broken machinery	48.00-49.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	27.00-28.00
No. 2 bundles	17.00-18.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	10.00-11.00
Short shovel turnings	13.00-14.00
Low phos. (structurals & plates)	33.00-34.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	23.00-24.00
Heavy breakable	*32.00-33.00*

Stainless Steel

18-8 sheets, clips, solids	185.00-190.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	75.00-80.00

BUFFALO

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	35.00-36.00
No. 2 bundles	25.00-26.00
No. 1 busheling	35.00-36.00
Mixed borings, turnings	17.00-18.00
Machine shop turnings	15.00-16.00
Short shovel turnings	19.00-20.00
Cast iron borings	17.00-18.00
Low phos. structurals and plate, 2 ft and under	42.00-43.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*43.00-44.00*
No. 1 machinery	*47.00-48.00*

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 3 ft and under	53.00-54.00
Railroad specialties	42.00-43.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	38.00-39.00
No. 2 bundles	25.00-26.00
No. 1 busheling	38.00-39.00
Machine shop turnings	19.00-20.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	22.00-23.00
Cast iron borings	19.00-20.00
Low phos, 18 in.	46.00-47.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast	39.00-40.00
Charging box cast	38.00-39.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00
Rails, 18 in. and under	55.00-56.00
Rails, random lengths	49.00-50.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	33.00
No. 2 heavy melting	30.00
No. 1 bundles	33.00
No. 2 bundles	23.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	39.00†

Cast Iron Grades

No. 1 cupola	*42.00*
Heavy breakable	27.00-28.00†
Foundry malleable	37.00
Unstripped motor blocks	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00†

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	20.00-21.00
No. 1 bundles	25.00-26.00
No. 1 busheling	25.00-26.00
Machine shop turnings	7.00-8.00
Short shovel turnings	10.00-11.00
No. 1 cast	33.00
Mixed cupola cast	33.00
No. 1 machinery cast	34.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	22.50-23.50
No. 1 bundles	*36.00-37.00*
No. 2 bundles	24.00-25.00
No. 1 busheling	35.00-36.00
Machine shop turnings	*13.00-14.00*
Mixed borings, turnings	*13.00-14.00*
Short shovel turnings	*14.00-15.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	33.00-34.00
Charging box cast	33.00-34.00
Heavy breakable	35.00-36.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	*47.00-48.00*

SEATTLE

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 1 bundles	29.00
No. 2 bundles	23.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	9.00-10.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	31.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	23.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	*36.00*
No. 2 heavy melting	*34.00*
No. 1 bundles	*33.00*
No. 2 bundles	*18.00*
Machine shop turnings	15.00
Shoveling turnings	18.00
Cast iron borings	15.00
Cut structurals and plate 1 ft and under	*47.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00

SAN FRANCISCO

No. 1 heavy melting	32.00-34.00
No. 2 heavy melting	30.00-32.00
No. 1 bundles	30.00-32.00
No. 2 bundles	22.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Cast iron borings	15.00
Heavy turnings	15.00
Short shovel turnings	15.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	34.50
No. 2 heavy melting	30.50
No. 1 bundles	34.50
No. 2 bundles	25.00
Mixed steel scrap	26.50
Mixed borings, turnings	15.00
Busheling, new factory:	
Prepared	34.50
Unprepared	28.50
Short steel turnings	19.00

Cast Iron Grades‡

No. 1 machinery cast	39.00-41.00

†Nominal.
‡F.o.b. Hamilton, Ont.

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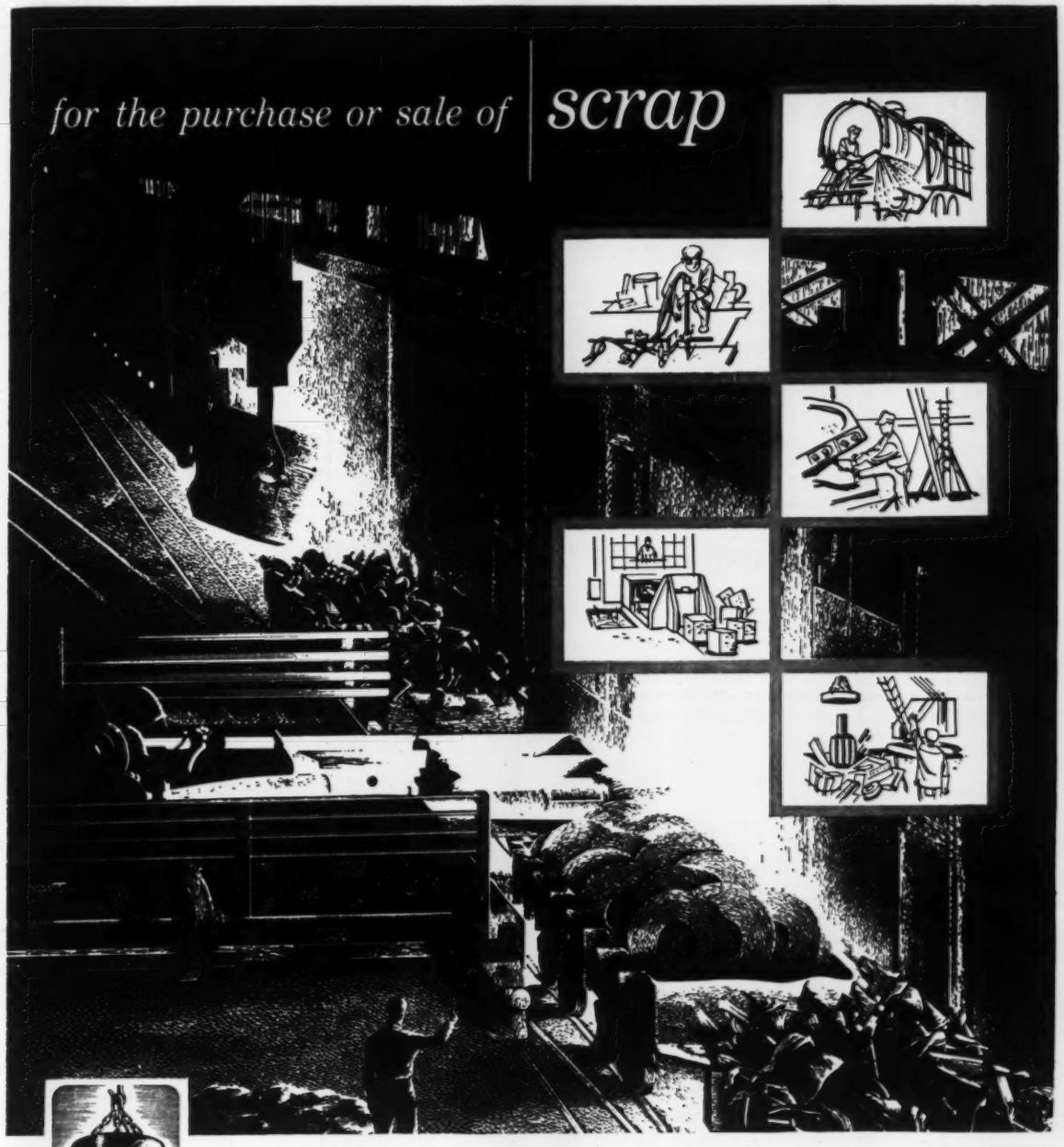

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Labor Pacts Are Coming Due

Many contracts signed in 1956 expire this year. Labor peace will be touch and go, but producers hope they can avoid shutdowns. Steel may set pattern

Nonferrous Metal Prices, Pages 110 & 111

LABOR may hold the key to how high nonferrous sales climb in 1959 and how well profits recover. Here's why: Many metal companies will have to write agreements with workers in the next few months.

• **What Labor Will Ask**—The unions haven't unlimbered their siege guns yet, but you can bet that their efforts won't be puny. It's a safe guess the least they'll go for is a contract as good as the one that's expiring. Of course, they'll want more base pay, but the big guns may be trained on such fringe benefits as improved pension plans, higher SUB payments, more paid holidays and longer vacations, incentives, job classifications, and other working conditions.

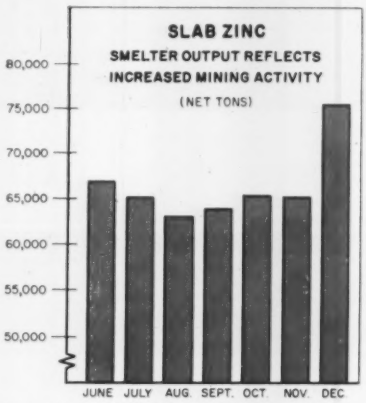
One issue that's sure to arise is the problem of technological unemployment — unions are becoming increasingly nervous about shrinking work forces that may result from automated facilities.

• **What Management Will Give**—Companies are conscious of their weakened profit picture even if labor isn't. They won't grant all the unions ask, but they don't expect to get off easily. Look for compromise agreements with nonferrous management shooting for relatively long term contracts with nonstrike clauses.

• **Strike Odds**—This may be the year that companies "hold the line" against union pressures, say some metalmen. But battle scarred veterans of the negotiation table generally don't see any lengthy holdouts. They point out: Stockholders will balk at a prolonged stoppage, and customers who clamor "don't give in" are the first to pressure for a settlement if their own businesses are endangered by the dispute.

Watch steel industry negotiations as a possible preview of things to come in nonferrous wage talks. If steel decides to stand pat, other metals may do likewise. Conversely, a settlement favorable to the union would weaken the position of other metals.

Here's how the labor situation



Source: American Zinc Institute Inc.

stands in the four major nonferrous metals:

• **Aluminum**—The industry's three year labor contract expires July 31. It has cost the industry an estimated 62.6 cents per manhour. Breakdown: Wages, 29.75 cents; cost of living, 17 cents; fringe benefits, 15.85 cents. Watch for aluminum, in particular, to parallel the steel settlement. Reason: Better than 50 per cent of the industry's labor force belongs to the USW.

A USW official says the demands made of aluminum will be about the same as those for steel. He comments: "We have been contented but not satisfied with the current contract."

• **Copper**—Producers didn't do too badly with the three year contract signed in 1956. They got off with a package totaling 33 cents an hour. Breakdown: Wages, 24 cents; fringe benefits, 9 cents. At the time of contract signing, copper was riding a wave of prosperity, but even so, many believe the industry will have trouble holding demands at this level when the contract with the International Union of Mine, Mill & Smelter Workers expires June 30.

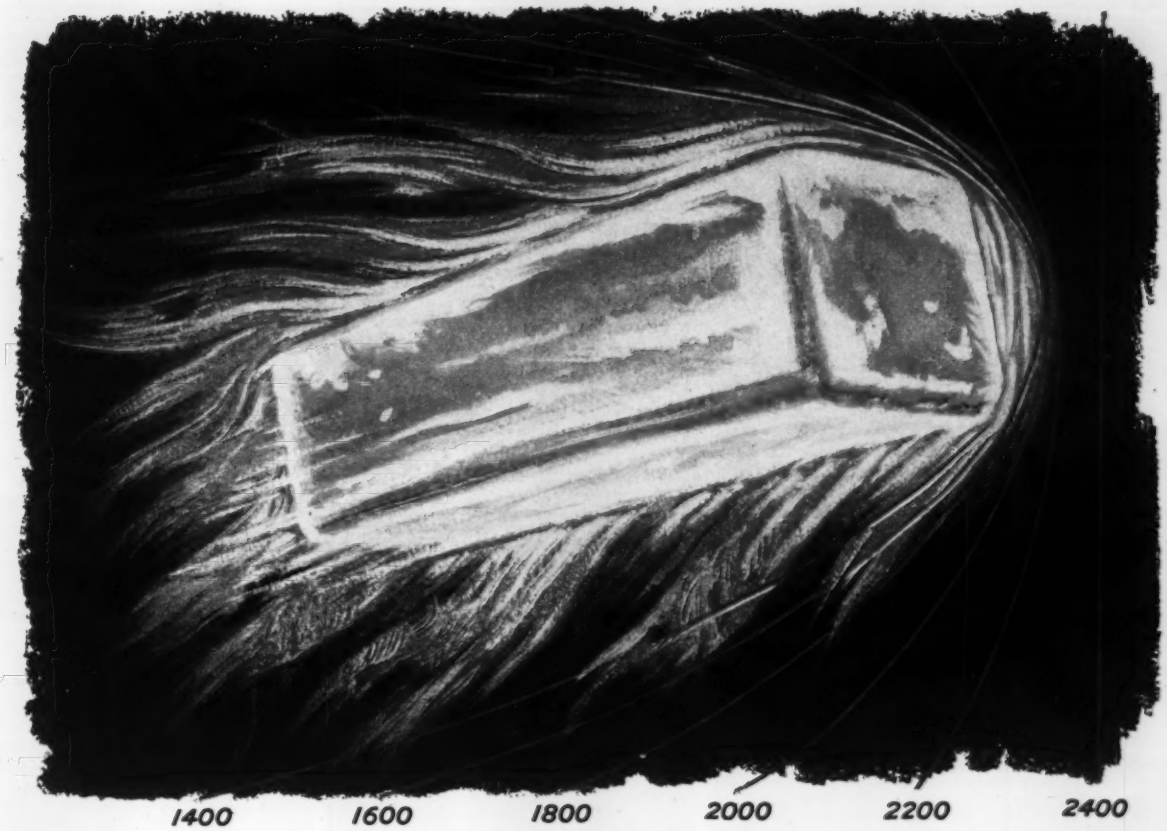
• **Lead, Zinc**—Not all contracts expire in 1959, but a great many do. Producers deal with some half dozen unions, so settlements don't follow a pattern. Example: One zinc contract signed in December called for a 3 cent an hour wage increase, plus a 2 cent an hour boost when and if the zinc price reaches 12 cents a pound and another 2 cent hike if the price goes to 12.5 cents.

A large segment of the lead-zinc industry has a three year contract with the IUMMSW (it runs out July 1) which cost 21 cents in hourly wage increases and 3 cents in fringe benefits. Workers will be a little more demanding this year, but observers believe they'll probably end up with a boost of around 3.5 per cent over a three year period.

NONFERROUS PRICE RECORD

	Price Jan. 14	Last Change	Previous Price	Dec. Avg	Nov. Avg	Jan., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	26.000
Copper	29.00-29.50	Jan. 12, 1959	29.00	28.856	29.415	25.135
Lead	12.80	Oct. 14, 1958	12.30	12.800	12.800	12.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	98.875	Jan. 14, 1959	99.00	99.019	99.034	92.933
Zinc	11.50	Nov. 7, 1958	11.00	11.500	11.386	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.



Bending the Heat Barrier

Specialized mill equipment is available at HAYNES STELLITE for rolling high-temperature alloys into a variety of shapes and sizes. Bar (above) is being produced on a 24-inch mill.

High strength plus resistance to oxidation, creep, thermal shock, and fatigue—are some of the properties that have helped to push the heat barrier back over the past 15 years. These are the properties found in HAYNES high-temperature alloys. Properties that make these alloys very useful in the 1000 to 2000+ deg. F. range.

Typical uses? The really hot spots in jet aircraft, ramjets, and missiles are some. Furnace components, heat-treating equipment, kiln liners are others. In fact, any part where long service life under severe high-temperature conditions is essential.

There are 12 HAYNES high-temperature alloys—available immediately in convenient forms that can be readily fabricated. For information on properties and prices, write for descriptive literature.

HAYNES
ALLOYS
HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
Kokomo, Indiana

UNION CARBIDE

The terms "Haynes" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.45 per lb deld.

Cobalt: 97.99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.

Copper: Electrolytic, 29.00 deld.; custom smelters, 29.50; lake, 29.00 deld.; fire refined, 28.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-80 nom. per troy oz.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, 9Z91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $218-221 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusion, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. points of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $15-17 per troy oz.

Platinum: $52-55 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 90.125 per troy oz.

Sodium: 17.00 c.l.; 19.00-19.50 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 98.875.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.62-1.82; grade A-2 (0.5% Fe max.),$1.70 per lb.

Tungsten: Powder, 89.8%, carbon reduced, 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime Western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.50; special high grade, 12.75 deld. Diecasting alloy ingot No. 3, 14.00; No. 2, 14.25; No. 5, 14.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.875-25.25; No. 12 foundry alloy (No. 2 grade), 21.75-22.00; 5% silicon alloy, 0.60 Cu-max., 24.75-25.00; 13 alloy 0.60 Cu max., 24.75-25.00; 195 alloy, 25.25-26.00; 108 alloy, 22.25-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.50; grade 2, 22.00; grade 3. 21.00; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 28.00; tin bronze, No. 225, 37.50; No. 245, 32.25; high-leaded tin bronze, No. 305, 32.25; No. 1 yellow, No. 405, 23.00; manganese bronze, No. 421, 24.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B. 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.885, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.865, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 34.35; l.c.l., 34.98. Weatherproof, 20,000-lb lots, 35.54; l.c.l., 36.29.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.90-14.35; sheared mill plate, $5.00-8.50; wire, $5.50-9.50; forging billets, $3.55-4.10; hot-rolled and forged bars, $4.25-5.40.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H. R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003, and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	49.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.80	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.350	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam. 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

	Alloy	Alloy
Factor	6063-75	6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, .25-.30 in., 7300.

Extruded Solid Shapes:

	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
Factor		
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.90
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Copper and Brass: No. 1 heavy copper and wire, 22.50-23.00; No. 2 heavy copper and wire, 20.50-21.00; light copper, 18.25-18.75; No. 1 composition red brass, 16.50-17.00; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 29.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	53.13b	50.36c	....	53.39	25.000	25.000	24.250
Yellow Brass	46.57	31.22d	47.11	49.98	17.000	16.750	15.250
Low Brass, 80%	49.23	49.17	48.87	52.54	21.250	21.000	20.500
Red Brass, 85%	50.17	50.11	50.71	53.48	22.125	21.875	21.375
Com. Bronze, 90%	51.65	51.59	52.19	54.71	22.875	22.625	22.125
Manganese Bronze	54.98	48.58	59.08	....	17.750	17.500	16.875
Muntz Metal	49.35	44.66	....	....	17.875	17.625	17.125
Naval Brass	51.24	45.05	57.80	54.65	17.625	17.375	16.875
Silicon Bronze	58.27	57.46	57.81	75.95	24.625	24.625	23.625
Nickel Silver, 10%	62.20	66.60	64.03	....	23.875	23.625	11.937
Phos. Bronze	72.59	73.09	74.27	....	25.875	25.625	24.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.50-16.00; new brass clippings, 14.00-14.50; light brass, 10.50-11.00; heavy yellow brass, 11.50-12.00; new brass rod ends, 12.50-13.00; auto radiators, unsweated, 13.50-14.00; cocks and faucets, 13.50-14.00; brass pipe, 13.50-14.00.

Lead: Heavy, 8.25-8.75; battery plates, 4.00-4.25; linotype and stereotype, 10.00-10.50; electrotype, 8.50-9.00; mixed babbitt, 9.50-10.00.

Monel: Clippings, 30.00-31.00; old sheets, 27.00-28.00; turnings, 22.00-23.00; rods, 30.00-31.00.

Nickel: Sheets and clips, 52.00-55.00; rolled anodes, 52.00-55.00; turnings, 37.00-40.00; rod ends, 52.00-55.00.

Zinc: Old zinc, 4.00-4.25; new diecast scrap, 3.75-4.00; old diecast scrap, 2.50-2.75.

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 6.25-6.75; segregated low copper clips, 13.00-13.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.00-12.50; mixed high copper clips, 10.75-11.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 9.00-9.50; segregated low copper clips, 15.50-16.00; segregated high copper clips, 15.00-15.50; mixed low copper clips, 15.00-15.50; mixed high copper clips, 14.50-15.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 9.00-9.50; segregated low copper clips, 14.00-14.50; segregated high copper clips, 12.50-13.00; mixed low copper clips, 13.00-13.50; mixed high copper clips, 12.00-12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 55.00; light scrap, 50.00; turnings and borings, 35.00.

Copper and Brass: No. 1 heavy copper and wire, 25.50; No. 2 heavy copper and wire, 24.00; light copper, 21.75; refinery brass (60% copper) per dry copper content, 23.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.50; No. 2 heavy copper and wire, 24.00; light copper, 21.75; No. 1 composition borings, 19.50; No. 1 composition solids, 20.00; heavy yellow brass solids, 13.00; yellow brass turnings, 12.00; radiators, 15.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.45.

Copper: Flat-rolled, 46.79; oval, 45.00; 5000-10,000 lb; electrodeposited, 38.50, 2000-5000 lb lots; cast, 41.00. 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.45 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 14.65; 2000-5900 lb, 12.65; 6000-11,900 lb, 12.40; 12,000-22,900 lb, 12.15; 23,000 lb or more, 11.65.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 20.80; 400-800 lb, 19.80; 1000-19,800 lb, 18.80; 20,000 lb or more, 17.80.

Sodium Stannate: Less than 100 lb, 78.00; 100-600 lb, 68.80; 700-1900 lb, 66.00; 2000-9900 lb, 64.10; 10,000 lb or more, 62.80.

Stannous Chloride (anhydrous): 25 lb, 153.20; 100 lb, 148.30; 400 lb, 145.90; 800-19,900 lb, 105.00; 20,000 lb or more, 98.90.

Stannous Sulphate: Less than 50 lb, 138.40; 50 lb, 108.40; 100-1900 lb, 106.40; 2000 lb or more, 104.40.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

MELT SHOP METALLURGIST

For expanding basic steel producer in Chicago. Required are a metallurgical degree or equivalent and five or more years of steelmaking experience involving open hearth practices and procedures. Excellent advancement potential for qualified individual. Liberal employee benefit program. In reply give age, salary requirements, and complete resume of education and work experience. All replies will be considered confidential. Box No. 728, STEEL, Penton Bldg., Cleveland 13, Ohio.

MANAGER FORGING SALES

Open die forgings specialist required as consultant to senior management to develop present and potential markets for carbon and alloy steel forgings. This position with Canada's only fully integrated specialty steel mill includes:

- **development of present substantial hammer and press facilities**
- **advanced training of present sales staff**

Successful performance on this job can lead to managerial position in a separate forging sales operation. Extensive sales experience and a metallurgical engineering background in production and/or marketing are important considerations. Salary open to negotiation. Resumes in confidence to:

Manager of Personnel
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Welland, Ontario

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SALES REPRESENTATIVES
Salesmen currently selling joists, grating, or other allied products to the structural steel fabricators in Western Pennsylvania, Eastern Ohio, West Virginia and Eastern Seacoast States south of Virginia. Salesmen must be able to make take-offs from structural and architectural blueprints. In first reply please list items carried and exact territory covered. We are a specialty manufacturer selling the structural steel fabricators. Reply Box No. 721, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

WANTED: EXPERIENCED ROLLER FOR SMALL BAR mill. Southern location, excellent working conditions. Give resume experience, present employment, salary desired, and availability. Reply Box 729, STEEL, Penton Bldg., Cleveland 13, Ohio.

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7000 gallon complete TANK CARS
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Complete tank car or will remove tank. Can be inspected now at Kansas City.
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KEYSTONE LAMP MFG. CORP.
Purchasing Department
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Will sell 25% interest in $280,000 Steel Plate Fabricating Company for $35,000 to one who can qualify as President and General Manager.

The one who can qualify both financially and with experience will be issued 28,000 shares of $2.50 Par Value Stock totaling $70,000 in stock.

Owner has had many years of experience in the Steel Plate Fabricating industry.

Reply Box 727, STEEL
Penton Bldg. Cleveland 13, Ohio

ROLLING MILL METALLURGIST

For expanding basic steel producer in Chicago. Required are a metallurgical degree or equivalent and five or more years of steelmaking experience involving soaking pit and hot rolling mill practices and procedures. Excellent advancement potential for qualified individual. Liberal employee benefit program. In reply give age, salary requirements, and complete resume of education and work experience. All replies will be considered confidential. Box No. 731, STEEL, Penton Bldg., Cleveland 13, Ohio.

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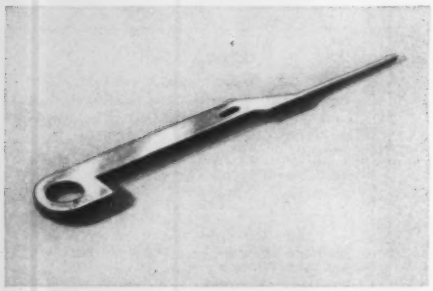
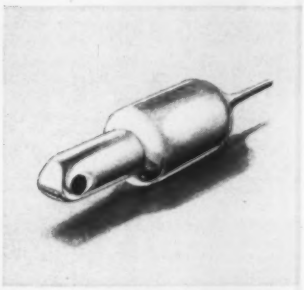
Let STEEL's classified columns do the job for you. STEEL reaches all types of executives in the metalworking industry. Plan now to reach the highly-trained men you want by means of an advertisement in the "classifieds." For rates, write STEEL, Penton Building, Cleveland 13, Ohio.

NEWS
from Torrington on
SMALL PRECISION METAL PARTS

"Custom manufacture" need not be costly—at least, as practiced at Torrington's Specialties Division. Our engineers, experienced in a multitude of methods and operations, have a knack for fitting the most efficient techniques to any small metal part in question. And these methods are not necessarily the most obvious. The motto might well be, "Precision at any cost—so long as it's the *lowest* cost possible!"





Take the control pin and sensing pin we make for a leading business machine manufacturer. Diameter of the circular section must be held to .001". Other critical dimensions require as stringent tolerances. Torrington selected a combination of stamping and swaging operations as most economical and efficient. High accuracy is achieved without tool marks or stress concentration points. Parts are tempered to RC 52-54, and are accurate to required tolerance *without grinding* and have a better finish than grinding would produce!

Then there's the pin we make for an aircraft application. Made of 440C stainless—a difficult material to work—it is finished to 8 micro-inches, again without grinding. The three radii are held concentric to .006". After tempering to RC 52-60, the part is given a .0002 to .0004" hard chrome plate.

Part of the perfection of the finished unit is the quality of material used. Skilled metallurgists have access to the most modern laboratory equipment to make sure materials meet your drawing specifications. We maintain three separate heat-treating departments, each with equipment selected for specific types of parts or materials involved. Statistical quality control methods insure the quality of product you specify. For help with

your large quantity requirements of small precision metal parts, just circle our number on the reply card, call our area salesman, or write direct to:

The Torrington Company, Specialties Division, 900 Field Street, Torrington, Conn.

TORRINGTON SPECIAL METAL PARTS

Makers of Torrington Needle Bearings

(*Concluded from Page* 105)

orders from foundries are anticipated shortly.

Prices of blast furnace grades are unchanged and little new business is reported. Low phos has moved up $2 a ton along with the steel grades, but railroad items are unchanged.

Cleveland—Buying has been light in this district and entirely for shipment to Valley mills. Although steelmaking operations are rising, supplies available to producers are ample.

Cincinnati—The scrap market is quiet, but a strong undertone is developing. Brokers are working on first-of-the-month mill orders and find some dealers reluctant to release material at current price levels.

Birmingham—After being in the doldrums for several weeks, the scrap market showed signs of life last week with open hearth, electric furnace, and cast consumers back in the market. But most of them have filled their January needs and will buy little over the remainder of the month.

Houston—A gradual strengthening of the southwest scrap market is expected by leading brokers. Bullish factors include strong mill operating rates, a pickup in exports from Gulf ports, and growing rumors that Mexican buyers will take up to 40,000 tons of Texas scrap in the next 30 to 45 days. Current movement of material has been sharply curtailed by low prices. Any price gains must first overcome tremendous scrap surpluses in all parts of the district. Leading mills have excess inventories.

Los Angeles—Prices dropped $1 last week on No. 1 and No. 2 heavy melting, No. 1 and No. 2 bundles, and cut structurals and plates, 1 ft and under. Another drop is expected in February, as mills begin reducing inventories in anticipation of property tax assessments in March.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 102

New England Coke Co., a subsidiary of Eastern Gas & Fuel Associates, Boston, advanced the price of foundry coke $2 a ton, f.o.b. Everett, Mass., effective Jan. 9. The market is now quoted at $33.55, delivered in New England or within the $5.15 freight zone from the works.

HOW ABOUT YOU?

Do you know that many cancers can be cured if detected early? That an annual health checkup is your best protection against cancer?

Are you giving yourself this big advantage? Or are you taking chances with your life because of foolish attitudes about cancer like these?

DON'T EVEN MENTION THAT WORD!

Fear keeps some people from even *learning* cancer facts that can save their lives.

NEVER FELT BETTER!

Checkups help to detect cancer in its "silent" stage before you notice any symptom.

COSTS TOO MUCH!

Dollars you spend for the protection of your health can mean years of life.

Millions of Americans have made an annual checkup a habit... *for life.* How about you?

AMERICAN CANCER SOCIETY

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Coming Jan. 26

IN

STEEL

U.S. Aid For Railroads

What's The Outlook?

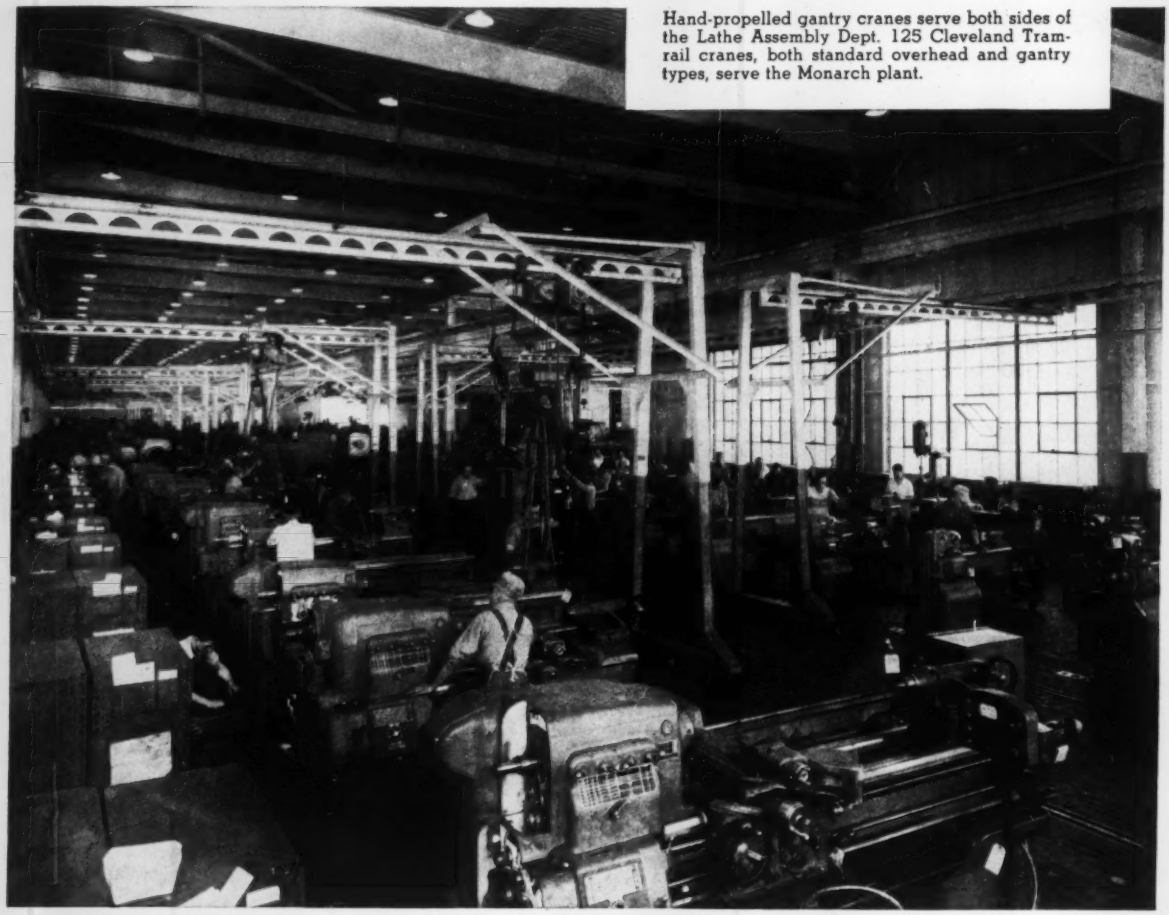
Congressmen have been doing a lot of pot stirring on Capitol Hill to whip up help for the nation's railroads. In cooking, the stirring motion is circular. Will that be the effect of government aid to railroads—forces set in motion, but only circular?

STEEL will present an analysis of the aid-to-railroads situation with a thoroughgoing article Jan. 26. Among the probing questions to be answered: Is government assistance to the roads as good as Congress hoped it would be? What about all of the merger talk? The Interstate Commerce Commission cleared the tracks with a green signal, but what are the roads doing? What earnings do the roads look for next year? What's the outlook for equipment purchases? Metalworking companies are expecting to sell many tons of steel for fabrication of new rolling stock. Will this develop?

As metalworking managers, you may have a stake in the future of railroading. Watch for the article in STEEL next week.

SUBSTITUTES CRANES for BRAWN ...and BOOSTS LATHE PRODUCTION

One Crane for Every 6 Production Workers



Hand-propelled gantry cranes serve both sides of the Lathe Assembly Dept. 125 Cleveland Tramrail cranes, both standard overhead and gantry types, serve the Monarch plant.

EVERY manufacturer recognizes the need of mechanical handling equipment for hoisting and moving parts weighing hundreds of pounds, but not so many appreciate the value of cranes for handling parts that are within a man's ability to lift.

The Monarch Machine Tool Company, Sidney, Ohio, the world's largest exclusive manufacturer of lathes, made a thorough study of the effects of heavy manual lifting. They found that parts weighing only 50 or 75 pounds can be the cause of smashed fingers, hernias, and other injuries. When such parts must be handled numerous times a day, worker fatigue becomes a serious problem and affects not only production but workmanship.

Cleveland Tramrail cranes have proven to be the solution to the problem. For more than 15 years Monarch has been using Cleveland Tramrail equipment and today has 125 cranes of the standard overhead and gantry types which provide handling service throughout its fine modern plant. The importance attached to cranes here is attested by the fact that one crane is provided for every six production workers on the job at any one time.

WRITE FOR FREE COPY of Engineering and Data Booklet No. 2008. Packed with valuable information. Profusely illustrated.

CLEVELAND TRAMRAIL

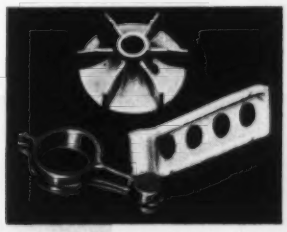
Overhead Materials Handling Equipment

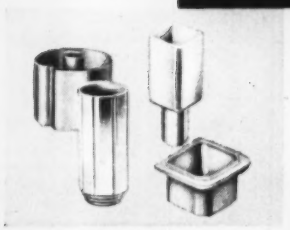
CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7822 E. 290 ST. • WICKLIFFE, OHIO

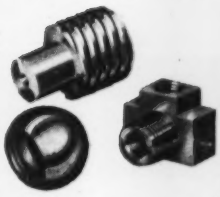
1 ONE DEPENDABLE SOURCE for all your fabricated metal parts

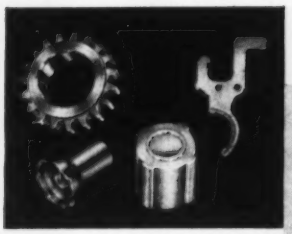
only MUELLER BRASS CO. offers *all these metal fabricating methods* to assure you the best product at the best possible price

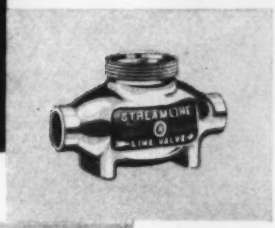
To obtain the desired physical and design requirements in a part at the lowest unit cost, there is usually one specific process by which that part can be most successfully and economically manufactured. Because the Mueller Brass Co. offers all these methods of production, you get sound engineering, the best method of fabrication and the assurance of getting the best product at the lowest cost. Sales and engineering service is available to you at Mueller Brass Co. offices throughout the United States. Make Mueller Brass Co. your one dependable source for all your fabricated part needs.

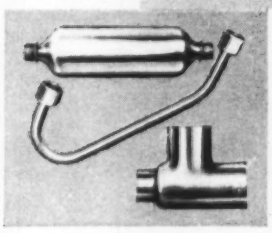












forgings

The Mueller Brass Co. is the world's largest producer of brass, bronze and aluminum forgings.

impact extrusions

The Mueller Brass Co. now offers "Cold-Prest" non-ferrous and ferrous impact extrusions. Flexible new facilities makes practical either long or short production runs of simple or complex shaped parts on an economical basis.

screw machine products

The Mueller Brass Co. maintains one of the largest automatic screw machine departments in the country, specializing in the manufacture of non-ferrous parts . . . completely equipped to perform secondary operations.

powder metal parts

Precision ferrous and non-ferrous powder metal parts are available from Mueller Brass Co. through its subsidiary, The American Sinteel Corporation.

castings

The Mueller Brass Co. has a modern foundry equipped to produce quality brass and bronze castings to your specifications.

formed copper tube

The Mueller Brass Co. offers complete facilities for producing formed copper tube shapes and assemblies to the most demanding tolerances.

also producers of:

Super Cutting Red Tip Brass Rod • Aluminum Extrusions • Aluminum Sheet, Coil and Strip • Plastic Pipe and Fittings • Copper Tube and Solder Type Fittings.

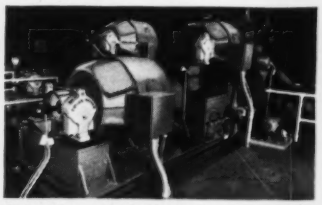
260

MUELLER BRASS CO. PORT HURON 26, MICHIGAN

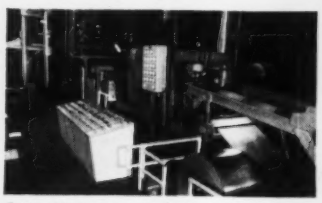
The Cutler-Hammer engineered D-c adjustable voltage control system provides precise, dependable speed control of the continuous steel ribbon from entry to exit in the world's fastest cleaning and annealing line.

Cutler-Hammer operator's control station at the entry end of the line.

Cutler-Hammer Unitrol provides a convenient, space-saving unit for all A-c auxiliary controls.



Cutler-Hammer 505 Mill Brakes are used on the winding reels and bridle stands.



Cutler-Hammer operator's control station at the exit end of the line.

Behind the scenes at Weirton Steel...

Cutler-Hammer Control keeps the world's fastest continuous cleaning and annealing line on the go

The new continuous strip steel cleaning and annealing line at the Weirton Steel Company division of National Steel Corporation is truly a remarkable engineering achievement. It automatically cleans and anneals an endless ribbon of cold rolled steel at speeds up to 2,000 feet per minute . . . a new world's record. But of equal importance is the fact it can deliver 20,000 tons of steel ready for tin plating every month.

Unquestionably, a processing line such as this represents a major capital investment which must pay for itself through high speed, dependable production day after day . . . month after month . . . year after year. And to a great extent its successful operation depends upon the trouble-free performance of the control equipment which integrates and regulates the complex system of individual machines that go to make up the line.

Here Cutler-Hammer's 65 years of control engineering experience provided the expert "know-how" in designing the *right* control system, the *dependable* control system for this performance champion.

You too will find it pays to work with Cutler-Hammer for the practical solution to all your mill control problems. Your inquiry will receive prompt attention. Write Department B-213, Cutler-Hammer Inc., Milwaukee 1, Wisconsin.

CUTLER·HAMMER
CONTROL
C·H

LOOK TO CUTLER-HAMMER MILL EXPERIENCE...AS BROAD AS IT IS LONG

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Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.; Intercontinental Electronics Corporation, Inc.